FOR THE PROJECT TITLED:

TENNESSEE SCHOOL FOR THE DEAF

NEW HIGH SCHOOL AND INFRASTRUCTURE UPGRADES

KNOXVILLE, TENNESSEE

DATE: SEPTEMBER 14, 2015
SBC NUMBER: 168/007-01-2013
PROJECT NUMBER: LGA 14042

OWNER:

TENNESSEE SCHOOL FOR THE DEAF

CONSTRUCTION MANAGER:

RENTENBACH CONSTRUCTORS, INC.

ARCHITECT:

THE LEWIS GROUP ARCHITECTS, INC., P.C.

CONSULTANTS:

ARCHITECTURAL CONSULTANT	HANSEL BAUMAN ARCHITECT + PLANNER
CIVIL ENGINEERING	FULGHUM MACINDOE & ASSOCIATES, INC.
STRUCTURAL ENGINEER	PWP STRUCTURAL ENGINEERS
FIRE PROTECTION/PLUMBING/ MECHANICAL ENGINEERING -	ENGINEERING SERVICES GROUP, INC.
ELECTRICAL ENGINEERING	VREELAND ENGINEERS, INC.
FOOD SERVICE	ANN DELAP

SET NO.

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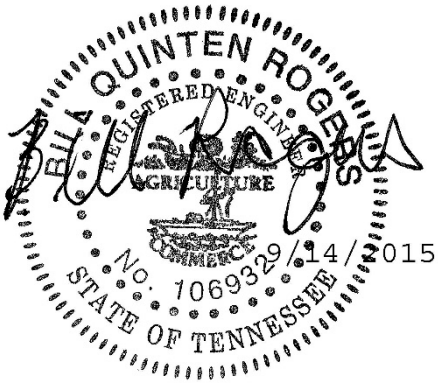
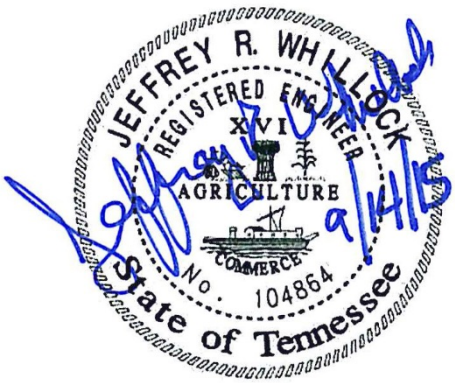
Civil Engineering



Structural Engineering



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Project:	**Tennessee School for the Deaf New High School and Infrastructure Upgrades** **SBC Project No: 168/007-01-2013**
Owner:	**Tennessee School for the Deaf** 2725 Island Home Avenue Knoxville, TN 37920
Architect/Engineer:	**The Lewis Group** 6512 Deane Hill Drive Knoxville, TN 37919
Construction Manager:	Rentenbach Constructors, Inc. 2400 Sutherland Avenue Knoxville, TN 37919-2354 865-546-2440

The project has an approximate construction duration of twenty months. The project consists of a new 70,000 SF two story High School, a new 16,000 SF single story Dining Hall, and various site utility upgrades. The exterior of both buildings is clad in brick, stone, aluminum curtainwall, Shingle and EPDM roofing. The project is scheduled to begin construction in November of 2015 and complete by the end of June 2017. This project will require the utilization of building information modeling as well as the State of Tennessee's new High Performance Building Requirements.

Sealed proposals for all work categories as described in the Project Manual for the above project will be received no later than **Thursday, October 8th, 2015 at 4:00 PM**. Proposals should be addressed to Justin Hall, Project Manager, and delivered to Rentenbach Constructors, Inc., 2400 Sutherland Avenue, Knoxville, TN 37919-2354.

Duplicate proposals shall be submitted to the Construction Manager at the above address on the proposal form provided, in a sealed envelope clearly marked **WORK CATEGORY NO. XX**, and shall be identified with the project name and the bidder's name and address.

All contractors bidding on work must be bondable and must include in their bid the cost for furnishing a Co-Obligee Labor and Material Payment Bond and a Co-Obligee Performance Bond.

On the proposal form the contractor will identify a cost to be deducted from their bid should bonds not be required.

There will be a pre-bid conference at 2400 Sutherland Avenue, Knoxville, TN 37919-2354 on Monday, September 28, 2015 at 2:00 PM conducted by the Construction Manager. It is strongly recommended that contractors attend the pre-bid conference.

Contract documents will be made available electronically via iSqft. Hard copies must be obtained at the cost of the bidder.

All questions are to be directed to the Construction Manager. No direct contact with the Owner or Architect is requested.

Each Proposal shall be accompanied by a certified check, cashiers' check, money order, or bid bond made payable to Rentenbach Constructors, Inc. in an amount not less than five percent (5%) of the base bid as a bid security. The Bid Security of Bidders under consideration will be returned immediately after award of contracts by the Construction Manager. The amount of the guarantee shall be forfeited to the Owner if the successful Bidder fails to enter into a contract and furnish required bonds and insurance within 30 days after award of contracts.

All proposals submitted shall remain valid for a period of sixty (60) days after the bid date. The Owner, Architect and Construction Manager reserve the right to waive any irregularities, reject any or all proposals, or accept any proposal, which, in their opinion, will serve their best interest.

END OF SECTION 00 11 16

INSTRUCTIONS TO BIDDERS

BIDDING DOCUMENTS

1.1 Bonafide prime Bidders and major subcontractors may obtain one Bid Pack, including Bidding Documents, Bid Envelope, and Bid Form, in accordance with provisions of the Invitation to Bid.

1.2 Individuals or firms securing Bid Packs become Bidders of Record, are automatically issued subsequent Addenda, and will have deposit refunded upon returning complete Bidding Documents unmarked and in good condition within fifteen (15) days after the scheduled opening of bids. Bidders of Record who do not submit a bid are also required to return the unused Bid Envelope. Upon failure to meet these conditions, deposit shall be forfeited.

1.3 Bidders of record may obtain additional copies of bidding documents at cost from Designer, but costs will not be refundable.

EXAMINATION

2.1 Bidders shall carefully examine site and documents to obtain first-hand knowledge of existing conditions and Work proposed. Copies of standards referenced in Project Manual are available for review through Designer's office.

2.2 Contractor will not be given extra payment for conditions which can be determined by examining site and documents.

QUESTIONS

3.1 Bidders shall submit questions about Bidding Documents to Designer in writing. Replies will be issued to Bidders of Record by Addenda and will become part of Contract Documents. Designer and Owner will not make oral clarifications.

3.2 Questions must be received by Designer at least four (4) calendar days before bid opening date.

3.3 In compliance with Tennessee Code Annotated 12-4-113, no Addenda will be issued less than forty-eight (48) hours of the bid opening, excluding weekends and legal holidays. The exception would be Addenda to extend the bid deadline.

3.4 Normal practice is that no Addenda affecting pricing will be issued less than three (3) calendar days before bid opening date.

SUBSTITUTIONS

4.1 Substitutions before receipt of bids shall be as identified in Conditions and Division 1 specifications. To request pre-bid approval of substitution, data required by Designer for evaluation must be received ten (10) calendar days before date set to receive bids. Acceptable substitutions will be identified in Addenda.

4.2 Bidders submitting bids in reliance upon a substitution when the substitution has not been approved prior to bidding do so at their own risk.

LIQUIDATED DAMAGES AND TIME

5.1 Conditions for liquidated damages are established in the Conditions. Time for completion and amount of liquidated damages are identified in bid form.

LICENSING AND QUALIFICATIONS

6.1 Bidders shall be familiar with the Contractors Licensing Act of 1976, as currently amended (codified in Tennessee Code Annotated Sections 62-6-101, et seq.). A contract will not be awarded to a bidder whose bid is in conflict with state licensing law.

6.2 In compliance with Tennessee Code Annotated Section 50-9-114(a), prospective bidders are advised that the Owner does not operate a certified drug-free workplace program providing for testing.

6.3 Bids submitted for this project shall not include a contractor or subcontractor that is disqualified from participating in State construction projects under the supervision of the State Building Commission. As a matter of public record, the State Architect maintains a list of those that are disqualified, and the Owner endeavors to include a current copy of that list in the bidding requirements for its projects as Information Available to Bidders. Failure to include a current list shall not negate the effect of disqualification.

PRE-BID CONFERENCE

7.1 Pre-bid conference may be held approximately ten (10) days prior to bid opening date at time and place to be announced. Bidders of Record will be notified in writing whether or not a pre-bid conference will be held.

BID FORM

8.1 Make bids on an unaltered Bid Form furnished by the Designer in Bid Pack and duplicated in Project Manual. Submit one Bid Form. Failure to completely fill out Bid Form may cause bid to be rejected.

8.2 If a Bidder chooses not to bid an alternate, unit price, or base bid in a multiple base bid project, write "no bid" in the space. To indicate availability of an add alternate at no additional charge, write "no charge" in the space. Additional stipulations or qualifications on Bid Form may cause bid to be rejected.

8.3 Bid Form shall be signed by person or persons legally authorized to bind Bidder to Contract.

BID SECURITY

9.1 Bid security is required in the amount of five percent (5%) of total amount bid, including alternates, made payable to State of Tennessee.

9.2 Bid Bonds shall be issued by surety company licensed to do business in Tennessee by Tennessee Department of Commerce and Insurance, and shall have certified and current power-of-attorney for attorney-in-fact attached.

9.3 Checks shall be certified or cashier's payable in U.S. dollars drawn on a U.S. bank. Bid security submitted in the form of a check is deposited by the Owner until conditions for a refund are met, and then refunded in accordance with normal State requirements for prompt payment. In order to obtain such a refund, the bidder must submit a completed Substitute W-9 Form, using the form of Section 00 54 35, within thirty (30) days of the bid opening. Bid security that has been deposited is valid for the one bid, and is not transferrable to another bid.

9.4 Owner may retain bid security of bidders to whom award is being considered until either (a) Contract has been executed, or (b) specified time has elapsed so that bid is not binding, or (c) bid has been rejected. If Bidder refuses to enter into Contract or fails to furnish all required attachments properly executed, the amount of bid security shall be forfeited to Owner as liquidated damages, not as penalty.

BID SUBMITTAL

10.1 Submit Bid Form, with required attachments, in Owner's Bid Envelope furnished by Designer in Bid Pack. Bidder shall fill in blank spaces on face of Bid Envelope, except blank provided for Designer's approval. When filling in base bid or alternate(s), bid amount in words takes precedence over the numerical amount.

10.2 If any work, regardless of dollar value, is required for plumbing, HVAC or electrical, list subcontractor that will perform that work. If Bidder will perform that work with Bidder's own forces, fill in Bidder's name as subcontractor. If the project

requires a geothermal subcontractor, list subcontractor and the Tennessee Environment and Conservation's permit number and classification. If amount of masonry work is such that a masonry license is required, list the subcontractor and license number. If no work is required in a category, write "N/R" (None Required) or "N/A" (Not Applicable) in space provided for subcontractor(s).

10.3 Provide State contractor license number, expiration date, and applicable classifications for Bidder and listed subcontractors, as applicable by State licensing law. If the value of subcontractor's work is such that no license is required, and subcontractor is unlicensed, fill in "N/A" in the license number column, but still fill in name.

10.4 Bidders are solely responsible for ensuring that bids are received by the time and at the place identified for receipt of bids. A bid sent by mail shall be enclosed in an envelope clearly marked "Bid Envelope Enclosed". Bids received late will be returned unopened. Please note that some State office buildings x-ray incoming mail and parcels. This could delay receipt of a bid reaching its intended destination in a timely manner.

RECEIPT AND OPENING OF BIDS

11.1 Bids will be received and opened at time and place identified in Invitation to Bid.

WITHDRAWAL AND MODIFICATION PRIOR TO CLOSE OF BIDDING

12.1 Bids, once submitted, may be withdrawn or modified before the scheduled opening time only upon receipt of request signed by a person legally authorized to bind bidder to contract. If bid is withdrawn, it may not be resubmitted. Modification to a bid amount may be made as "add" or "deduct" only. Oral, telephonic, telegraphic or electronic mail withdrawal or modification will not be considered. After time and date designated for receipt of bids, bid may not be modified during time period stipulated in Bid Form.

POST-BID WITHDRAWAL OF BID FROM CONSIDERATION DUE TO MISTAKE

13.1 Request to withdraw bid due to mistake must be in writing to Owner, delivered in person or postmarked certified or registered mail not later than twenty-four (24) hours after the time fixed for receipt and opening of bids. Request shall acknowledge that bidder refuses to enter into contract based on bid and intends to submit original work papers, documents, and materials used in preparation of the bid in like manner within five (5) working days following date of bid opening.

13.2 Bidder making such request will be removed from consideration for award of contract; and, a duly appointed review panel shall consider whether forfeiture of bid security should be waived.

CONSIDERATION OF BIDS

14.1 To be considered, bids shall be made in accordance with these Instructions to Bidders. Failure to comply with these bidding requirements may cause bid to be rejected.

14.2 The Owner reserves right to: reject unit prices proposed in a bid without invalidating other portions of bid; reject a bid which does not provide all required unit prices; waive informalities; and, reject any or all bids.

14.3 It is Owner's intent to award a contract, or multiple contracts in the case of multiple base bids, based upon lowest evaluated responsive bid submitted by responsible bidder for base bid plus alternates (if any) taken in order up to, but not to exceed the bid target. If the base bid of all bidders exceeds the established bid target, the low bidder is determined by the lowest base bid submitted by a responsible bidder irrespective of any alternates (if any) bid. When alternates are included in bidding, bid target will be announced at bid opening prior to opening bids. Alternates may be accepted or rejected at Owner's discretion, provided that final combination of base bid and accepted alternates does not change low bidder as established by above method.

14.4 When a tie bid exists, a lot or coin toss will be conducted until a successful bidder is determined.

14.5 In the case of a multiple base bid, Owner may award a combined contract for the Work of more than one base bid if the same bidder is the successful low bidder on each.

POST BID INFORMATION

15.1 Should a bidder wish to protest a Bid, the bidder shall submit a Protest Bond to the Owner in the amount of five percent (5%) of the protester's bid amount within seven (7) calendar days of the Bid opening. An example of Any Bid protests shall be submitted in accordance with SBC By-laws, Policy and Procedure, Item 18.

15.2 Each Bidder shall be prepared, if requested by Owner or Designer, to present evidence, within ten days of the request, of experience, qualifications, and financial ability to carry out the terms of the contract.

BONDS

16.1 Successful bidder shall provide bonds as required by the Bidding Documents and in accordance with paragraph 11.5.1 of the Conditions and paragraph 17.1 below. Bond forms shall be the State of Tennessee standard bond forms, which are sequenced in Project Manual as listed in Table of Contents. Contract Bond, if required, shall be in the amount of one hundred percent (100%) of the Contract sum. Three-Year Roof Bond, if required, shall be in an amount as stipulated on the Bid Form.

EXECUTION OF THE CONTRACT

17.1 If a Bidder is presented the written Agreement Form for signing, then that Bidder shall deliver to the identified Owner's representative, within five (5) calendar days after presentation, the required number of counterparts of the signed Agreement Form, Contract Bond (if required), Roof Bond (if required), certificates of insurance, and an "Authorization Agreement for Automatic Deposits (ACH Credits) Form".

17.2 For the purpose of computing time, the five (5) days referred to in paragraph 17.1 above commence the day after receipt of the Agreement Form by Bidder. Should the fifth day fall on a State holiday, or weekend, Bidder shall provide required documents as directed no later than the next working day; however, regardless of circumstances or causes for Bidder exceeding delivery time, Owner shall be entitled to either require forfeiture of bid security or to add for each day the Bidder exceeds the five (5) day period a corresponding extra day in which to return a fully executed contract, which return will be considered effectuated by mailing Agreement to the Contractor within the required time plus any extensions provided herein.

AWARD OF THE CONTRACT

18.1 Presentation of Agreement Form by Owner to Bidder for signature does not constitute award of Contract. Contract shall not be considered awarded until Bidder has received a fully executed Agreement.

PARTICIPATION OF DIVERSITY-OWNED BUSINESSES

19.1 It is the express desire of the State Building Commission to include an emphasis on diversity in its contractual relationships with contractors for the construction, demolition or renovation of State projects under the jurisdiction of the Commission. The Commission acknowledges that firms who demonstrate and embrace diversity within their programs and policies are assisting the State in achieving its goals in building a more reflective marketplace of the community within this state.

19.2 It is a requirement of all successful bidders on projects under the jurisdiction of the State Building Commission that they report to the Owner the names and amounts of contracts entered into with "Disadvantaged or Diversity-Owned Businesses" on their contract with the Owner in order for the Owner to collect data on such participation.

END OF INSTRUCTIONS TO BIDDERS

00 21 13

SECTION 00 33 00 – INFORMATION AVAILABLE TO BIDDERS

PART 1 - GENERAL

1.1 PURPOSE

A. This Section identifies information that was gathered solely for the use of the Designer, is not a Bidding Document, but is available for review by Bidders. Bidders have the entire responsibility for their interpretation and use of this information and shall not rely on the information for preparation of a bid.

1.2 INFORMATION AVAILABLE

A. Report of Subsurface Exploration prepared by Professional Engineers, Inc. dated April 9, 2015.

B. Report of Geophysical Services prepared by Professional Engineers, Inc. dated April 6, 2015.

C. Thermal Conductivity Test & Data Analysis Test Well #1 prepared by Mid-South Geothermal, LLC dated April 15, 2015.

D. Thermal Conductivity Test & Data Analysis Test Well #2 prepared by Mid-South Geothermal, LLC dated April 13, 2015.

E. Original Drawings for Poore Hall prepared by Painter, Weeks & McCarty, Architects dated November 18, 1957.

F. Tennessee School for the Deaf Poore Hall Hazardous Abatement Summary prepared by ENSAFE dated February 18, 2015.

G. Central Dining Hall Renovation Drawings prepared by Cooper & Perry dated November 28, 1973.

H. Tennessee School for the Deaf Central Dining Hall Hazardous Materials Survey Report prepared by ENSAFE dated September 8, 2015.

I. Tennessee High Performance Building Requirements (HPBr): Manual Version 1.0 dated January 19, 2015.

J. State of Tennessee Office of the State Architect (TN OSA) Building Information Modeling Standards (BIMs) Version 1.1 dated July 29, 2015.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 42 00

GEOTECHNICAL DATA

SUB-SURFACE INVESTIGATION AND REPORT:

A. Sub-surface investigation has been performed at the project site. This investigation was conducted, and a report obtained, solely for design purposes and is not a part of the Contract Documents.

B. The use and interpretation of this information will be entirely the responsibility of the using party. The Owner is not responsible for variations in the sub-surface conditions. Bidders shall decide for themselves the character of the material to be encountered.

C. The report of the findings for this investigation is on file in the Designer's office, and may be reviewed there by any prospective Bidder of Record. Bidders must call ahead to schedule an appointment.

END OF SECTION

DISQUALIFIED CONTRACTORS AND SUBCONTRACTORS

LISTING OF DISQUALIFIED CONTRACTORS AND SUBCONTRACTORS:

1. These contractors and subcontractors are disqualified from participating in State construction projects under the supervision of the State Building Commission for the duration of the dates indicated. Such disqualification extends to succeeding or related corporations, partnerships, joint ventures, and other business organizations having substantial factual or legal connections, continuity, or identity with those that have been disqualified.

2. This list originates from the State Architect, and is deemed accurate as of the date of its issue, and may also be viewed on the Finance and Administration Web page at http://www.tn.gov/finance/OSA/contractorsInfo.shtml a more current list may be available.

3. Debarment of a contractor or sub-contractor by any other state agency may be cause for debarment of award of a contract on projects under the jurisdiction of the State Building Commission. A listing of debarred contractors for the Central Procurement Office, Department of General Services, can be obtained through their office.

There are currently no disqualifications in effect.

END OF SECTION

Trade Contract Proposal
Pre-Submission Checklist

- ☐ Trade Contract Proposal Form completely filled out?
- ☐ Form signed by authorized officer of firm?
- ☐ Performance and Labor & Material Bond costs included in base bid proposal sum?
- ☐ All taxes included in base proposal sum?
- ☐ Bid security (bond or certified check or money order) of at least 5% of base proposal sum included?
- ☐ Requested alternates & unit prices quoted?
- ☐ All information (proposal, bond, etc.) Submitted in duplicate?
- ☐ Proposal submitted in sealed envelope per specifications?

The Work Category (W.C.) Description is included as a guide for Prospective Bidders to summarize the scope of work involved with the work category. The description included is **not** a final summary of the scope of work and should not be construed as such. **All** Contract Documents should be used, as a reference in preparing the Bid Proposal and any omissions in the proposal does not relieve the successful bidder of the responsibility to perform this work.

W.C. No.	Category Description	Specification Reference
00	**ALL TRADES REVIEW THIS CATEGORY**	**All Division 00 and 01 Specifications**
01C	Selective Demolition	**024119**
02	Earthwork / Site Utilities	**All of Division 31, 329219, All of Division 33**
06	Asphalt Paving	**321216, 321600, 321723**
07	Fencing	**See Work Category**
10	Concrete	**031513, 033000, 072616, 321313**
11	Masonry & Stone	**042000, 044200, 072100, 078456, 079200**
12	Structural Steel, Deck, Stairs/Misc Steel	**051200, 052100, 053100, 055000, 055100, 055213, 057300**
13	Waterproofing/Dampproofing	**071113, 071326, 079200**
14	Roofing & Sheetmetal	**072200, 073113, 074113, 075323, 076200, 077100, 077233, 07920, 108213**
15	Metal Panel Siding	**074110, 074216, 076200, 079200**
18	Glass/Glazing & Aluminum Entrances	**079200, 084113, 084413,088000, 088813,**
20	General Carpentry / General Trades	**061053 – by CM**
20A	Millwork/ Woodwork	**064023, 066116**
20B	Doors, Frames, and Hardware	**081113, 081416, 087100,**
20C	Sectional Overhead Doors	**083323, 083493, 083495, 111319**
20D	Laboratory Casework & Fume Hoods	**115313, 123553**
20E	Glue Lam Beams	**061813**
21	Stucco/Framing/Drywall /Insulation	**072100, 072500, 078456, 061600, 054000, 054400, 092200, 092216, 092900,**
21E	Acoustical Panel Ceilings	**079200, 095113**
22A	Resinous Flooring	**079200, 096723**

22B	Resinous Matrix Terrazzo Flooring	**079200, 096623**

23	Carpet & Resilient Tile	**093000, 096500, 096813**

24	Painting	**079200, 099123**

25	Toilet Accessories, Compartments, & Fire Protection Specialties	**102113 – Furnish Only, 102813 – Furnish Only, 104400 – Furnish Only**

25D	Window Treatments	**122413**

25E	Signage, Directories	**101413**
25H	Operable Partitioning	**102226**

25J	Lockers & Accessories	**105113**

26	Fire Protection	**078413, 083100, 210500**

27	Mechanical Systems	**078413, 083100, All of Divisions 22 and 23**
27C	Geothermal Wells	**TBD by Addenda**

28	Electrical Systems	**078413, 083100, All of Division 26, Raceways for Division 27, All of 280000, Raceways for 281700, All of 283100.**
28A	Communications	**Cabling and Termination By Owner - 270000, 275123**

29	Food Service Equipment	**By Owner - WC's 26, 27, & 28 to Coordinate & Connect to utilities**

30	Elevators/Lifts	**078413, 142423**
40B	Soils & Material Testing	**014325**

Work Category No. 00 – General Requirements for All Subcontractors

Special Provisions:

1. General - All Bidders are responsible to review all work categories descriptions, and report any conflicts or ambiguities which may affect the execution of their Work Categories. All Bidders are responsible to review all Bidding Documents and become familiar with them to coordinate their work accordingly. Work Category descriptions should in no way be construed as being all-inclusive. Should a conflict exist between the Work Category description and other Bidding Documents, the Work Category description shall prevail and take precedence. Bidders are required to bid the entire Work Category and may bid more than one Work Category.

2. Electronic Documentation – In an effort to promote sustainability, information shall be conveyed electronically to the greatest extent possible.

3. Pre-approved contractors – The invitation procedure requires that each primary bidder be pre-qualified by the Construction Manager. If you are unsure if you are pre-qualified please contact Justin Hall immediately at 865-544-2440 or Justin.Hall@rentenbach.com. Subcontractors and vendors responding to the primary bidders do not need to be pre-qualified. To become pre-qualified, please visit the following link - (http://www.rentenbach.com/sites/www/Uploads/Trade%20Contractor%20Forms/RCI%20Trade%20Contractor%20Information%20Request%20Form.pdf) and fill out the "Trade Contractor Information Request" form.

4. Sustainable Design Requirements: Tennessee High Performance Building Requirements - Review Division 1 – Section 018113 - Sustainable Design Requirements

5. Construction Waste Management And Disposal – Review Spec Section 017419 Construction Waste Management And Disposal.

6. General Commissioning Requirements – Review Spec Section 019113 General Commissioning Requirements.

7. Indoor Air Quality Management Plan – During Construction. Comply with site specific IAQ Management Plan for this project.

8. Project Scheduling - A preliminary project schedule has been included within the Bidding Documents for your review and use. As input from the Trade Contractors is provided and as progress begins, this schedule will be periodically updated and re-issued. Each Trade Contractor is required to become familiar with the preliminary schedule and sequence their work accordingly. Activity durations shall be maintained regardless of actual start dates.

9. Post Bid interviews – We will be holding post bid interviews for the low qualified bidders immediately after bids are received. It is essential to the interview process that the primary and secondary Trade Contractors are included in the meeting, as well as the intended project foreman and project manager. The purpose of the interview will be to discuss the bids but will also focus on schedule, submittals, safety, site utilization and unique project requirements.

10. Shop Drawings & Submittals – The Trade Contractor shall review, approve in writing, and submit through the Construction Manager all submittals within two weeks after contract award at the latest, as to cause no delay in the work or in the work of any separate Trade Contractor. Shop drawings, product data and samples shall be properly identified as specified or as the Construction Manager may require. At the time

of submission, each Trade Contractor shall inform the Construction Manager in writing of any deviation in the shop drawings, product data or samples from the requirements of the Bidding Documents.

For Re-Submittals – Each Trade Contractor shall make any corrections required by the Construction Manager or Architect and shall resubmit the shop drawings, product data or new samples until approved. Each Trade Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data or samples, to revisions other than those requested by the Construction Manager or Architect on previous submittals. Refer to Section 01300 Submittals for definitions of Action Markings.)

11. All bidders shall become familiar with Building Information Modeling (BIM) – Reference Section 01 31 13.

12. Projects Website – Rentenbach has set up a Project Website for the construction documents for the project (http://projects.christmanco.com/TSD/default.aspx). This website will be used for (not limited to) the following:

    a. Submittal upload and approvals
    b. RFI upload and approvals
    c. Updated drawings
    d. Updated schedule
    e. Meeting minutes
    f. Project directory
    g. Testing reports
    h. Notice of commencement
    i. MSDS

    Once at the Projects Website at projects.christmanco.com/TSD (no www.), click on "Click here to access full library". This will be the main library for the project and where you will find all of the folders. For ease of use, we recommend that you add this page to your favorites.

    Use of the Projects Website is provided as a convenience to Bidders. Please note: proposals are based on all contract documents. Therefore, a complete review of all documents should be completed before submitting a bid.

13. Submittal Uploads –All submittals must be submitted to The Christman Company via the Project Website and must be the original PDF document. Hard copies or re-scanned documents will not be accepted. The only exception is actual samples (paint draw downs, masonry, etc.); however, all brochures and product data related to these samples must be submitted electronically.

    Your submittals folder can be found at the main library and is named "09-0 Work Category". You then will find your appropriate WC#. The original PDF documents should then be uploaded to the "Submittals in For Approval" folder. You will then send an email to Justin.Hall@rentenbach.com to notify the Construction Manager that the upload is complete. The Construction Manager will then take over the process for that submittal; once the review process (by the Construction Manager, Architect and Owner) is complete, the Construction Manager will upload the reviewed submittal to the "Reviewed Submittals" folder.

    For any questions regarding this process, email Justin.Hall@rentenbach.com.

14. Schedule of Values (SOV) – submit for approval through the Trade Contractor Portal. Once approved, adhere to the Application for Payment process. The SOV must be divided up by building (High School vs. Dining Hall).

15. Application for payment – Create and Submit the Pay Application through the Trade Contractor Portal. Payment period: Pencil copies are due the 20th of each month and revised signed payment applications are due the 25th of each month. Each request for payment shall be provided with a fully executed sworn statement along with its relative unconditional waivers. All subcontractors and suppliers are to be listed on the sworn statement.

16. Existing Services –The existing utilities and fixtures (power, plumbing, fire alarm system and fire suppression) will be out of service and unavailable during construction. Temporary Services will be provided by trade contractors as defined in the Work Categories for those trades. Care must be taken when working around temporary services on the site and in the building.

    Under conditions where tie-ins to existing services/utilities are required, each Trade Contractor will be required to notify Construction Manager Ten (10) working days in advance. Pre-Task planning and shut-down notifications will be required to assure minimum interruptions to Owner operations, including performing required tie-ins after normal working hours. Trade Contractors are responsible to cover premium time costs to complete required tie-ins.

17. Hoisting – Each Trade Contractor is to provide their own means for hoisting, loading and unloading material, supplies etc. No crane, boom truck, fork lift, or any other equipment will be provided by the Construction Manager.

18. Site Boundaries – This work will take place on an active campus with special needs children. TAKE NOTE OF SECTION 01 35 13.22 "Special Schools Project Procedures. All work must stay confined within the noted limits of construction. Any work extending outside this area or affecting campus operations outside this area must be coordinated well in advance of the work with the construction manager and owner. (Note AS1.01)

19. Existing Facilities – No existing facilities will be provided for use by construction personnel. Construction Manager will provided temporary toilet facilities. MEP trade contractors will provide temporary utilities (see specific Work Categories for requirements provided by each MEP trade contractor.)

20. Material Deliveries and Staging – All material deliveries must be coordinated with the Construction Manager a minimum of 24-hours in advance of said delivery. At no time, will delivery trucks be allowed to stage or park on existing roads and parking lots. Queuing for trucks will be available on-site at designated locations as coordinated with the Construction Manager. If deliveries require traffic control, the Trade Contractor is required to provide flagmen accordingly. All Trade Contractors are responsible for directing responsible trucks into project site, unloading of materials, handling, protection and storage of all received equipment. The Owner and Construction Manager will not accept deliveries. See Site Logistics Plan and Site Access Plan.

21. Communication and Phones – All Trade Contractor field supervision shall have cellular phones available for communication with Rentenbach's field personnel. All project managers shall have email access for communications with Rentenbach's office personnel. Cell phone use by trade personnel (non-supervisory) will not be permitted, except during breaks or lunch.

22. Independent Testing, Inspections and Commissioning – The Construction Manager has arranged independent testing for certain portions of the project. All Trade Contractors are to cooperate and

provide access and assistance for the independent testing and inspections to be performed. These services include but are not limited to: soil/material testing and commissioning.

23. Layout –The Construction Manager will provide two perpendicular control lines established at the a corner of each building footprint, and one elevation benchmark at each building (Dining Hall and High School).

24. Noise, Odors & Vibration –Due to close proximity of adjacent existing facilities, vibration must be closely monitored as to not cause any damage to the existing building and facilities. Odor causing chemicals, adhesives, paints, cleaning supplies must have MSDS sheets submitted and approved by the Construction Manager prior to use. All equipment shall be self powered.

25. Jobsite Safety Orientation – All Trade Contractors of any tier and visitors entering this jobsite will be required to check-in with the Construction Manager upon arrival at the project site. Trade Contractors at their own expense, must have completed the Tennessee Bureau of Investigation (TBI) / Federal Bureau of Investigation (FBI) Tennessee Applicant Processing Services (TAPS) background checks on file for each employee performing services on the TSD campus. A copy of each individual's background check must be provided to the Construction Manager to be kept on file at the jobsite. Check-in procedures will include the review and acknowledgement of the Construction Managers Project Specific Safety Orientation and Policies as well as watch the Safety Orientation Video. All construction personnel will be required to wear The Rentenbach issued safety sticker when working on or visiting this jobsite. TSD will issue badges that must be worn the entire time while onsite. Trade contractors will be responsible for cost of any lost badges.

    a. Safety (see contract form section for project safety program) - It is a fundamental value of the Construction Manager that safety is always a primary consideration. There is no phase of the project that has greater importance than accident prevention and the preservation of human resources. The Construction Manager's safety program is stringent and rigorous. The following represents a few important pre-construction requirements that apply to this project. Before any awarded Trade Contractor starts work on-site, the following requirements shall be satisfied:

        i. Provide a copy of Trade Contractor's site specific safety program.

        ii. Attend Construction Manager's project specific safety orientation program, which includes review of our safety video, review of project specific written safety program, review of Project Specific Infection Control Policy, sign-in and badging requirements.

        iii. No tobacco products, including but not limited to cigarettes, E-cigarettes, cigars, chewing tobacco, etc. are permitted on Tennessee School for the Deaf Campus.

        iv. Provide a copy of Material Safety Data Sheets (MSDS) for all proposed materials.

        v. Hardhats and safety glasses are to be worn at all times. Additional personal protection equipment will be worn appropriately based on the work performed.

        vi. Designate a Safety Representative(s) who will be working on-site – Provide telephone numbers and emergency telephone numbers.

        vii. Hoisting over occupied areas will not be permitted unless areas are vacated or a controlled access program initiated.

        viii. Hot work permits shall be obtained as required, including fire watch requirements.

ix. Shut down notifications shall be obtained as required with a minimum of five (5) working days advance notice and must be approved by the owner.

x. An understanding of our safety program and specifically our policy that in the event of an injury or near miss, all parties involved will be required to take a drug screening test immediately. Failure to perform the required test will result in removal from the site.

xi. Fall protection shall be worn and used, 100% of the time, by all persons when there is exposure to a fall greater than six (6) feet unless other provisions such as guardrails, safety nets, or fall restraints have been provided. This includes, but is not limited to, steel erection (including connecting, bolting-up, decking, welding or any other steel erection activity), pre-cast erection, roofing activities and masonry work including overhand laying operations.

xii. Hot Work Permits - Hot work permits will be required during all cutting, grinding, welding and torch cutting activities, including fire watch requirements. These permits are to be filled out in the jobsite trailer with a copy of it to be placed at the place of hot work.

26. Progress Cleanup – A composite clean-up crew will be assembled each Friday immediately after lunch in order to clean up general debris not identifiable to an individual Trade Contractor. Each Trade Contractor shall provide labor and supplies as directed by the Construction Manager to support this effort. For each (3) personnel onsite, one laborer is to be provided for this activity. This does not relieve any Trade Contractor of their responsibility to cleanup all debris resulting from their own operations on a daily basis and discard waste into jobsite dumpsters provided by the Construction Manager (as identified in section 01524), Each Trade Contractor shall clean all surfaces and leave the work area "broom clean" or its equivalent, unless otherwise specified.

    If contractors do not maintain their work areas or provide the proper resources for our daily clean up, Rentenbach will provide one warning to the contractor. If the problem continues after the warning, Rentenbach will provide labor for the relative clean-up at the cost of the contractor.

27. As-Builts – As-Builts must be accurately updated throughout the project. At the end of the project, the trade contractor must update the As-Builts and forward the following to Rentenbach: CAD drawing file, PDF file and two full size hard copies. See BIM and Coordination requirements listed in spec section 01 31 13.23

28. Warranties – The contractor shall guarantee all materials and work for a period of one year from Substantial Completion unless a greater duration is called for in the specifications related to that Work Category. Before final payment, Contactor must provide a letter of guarantee confirming the effective date and duration of the guarantee.

29. Waste Management/Indoor Air Quality Plan – The Construction Manager's Waste Management Plan and Indoor Air Quality plan will be strictly adhered to for this project. Please pay special attention to these specifications. The trade contractors are responsible to provide the necessary resources to follow these guidelines.

30. Work Hours - Common jobsite working hours shall be 7:30 am to 4:00 pm, Monday through Friday. Any overtime requires advance approval by Construction Manager.

31. Sealant Schedule - Sealants are to be installed as listed in the schedule below. If sealants are required by the specification for a specific system that is are not listed, then the Trade Contractor installing the product shall be responsible for the associated caulking.

Sealant Schedule		
Item to be sealed	Responsible WC	Comments
Door Frames	24	
Plumbing fixtures	27	
Glazing Systems	18	
Masonry Systems	13	
Countertops / Millwork	20	
Metal Panel Systems	15	
Roofing Systems	14	
Top of Base	22 (Epoxy Flooring Contractor)	Where base type EPX 1 is indicated on finish schedule

Summary of Work:

1.1 Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this section.

1.2 Information given in the Division 1 General Requirements shall supplement information given in the General and Supplementary Conditions. The most stringent provision in the General Conditions, General Requirements, Contract Drawings and Specifications shall govern the execution of any work or requirement.

CONSTRUCTION MANAGER

1. Rentenbach Constructors, Inc. is the Construction Manager. Wherever the term General Contractor or Contractor (in the context of the General Contractor) is used, it shall be given the same meaning as Construction Manager.

2. The Trade Contractor and his sub-Trade Contractors shall agree to and accept the same responsibility and follow the same terms of the Conditions of the Contract as the Construction Manager for the work for which he is under contract.

PROJECT

1.1 The Work as defined in the General Conditions and described in the Contract Document.

REPLACEMENT MATERIAL (For Owner's future use)

1.1 If any specific amounts are called for in the individual Sections, provide the specified amounts. If none are specified and a surplus is left, request instructions from the Construction Manager before discarding the surplus.

LABOR, MATERIALS, TAXES & WORKMANSHIP

1. LABOR AND MATERIALS

1.1 Unless otherwise specified in these Contract Documents, all materials and workmanship shall be new and of the best grade of their respective kind for the purpose.

1.2 Unless otherwise specifically provided in the Contract Documents, the Trade Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

1.3 The Trade Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

2. TAXES

1. Unless tax exempt status is specifically noted, it is understood that the bid prices stated shall include all applicable Federal, State or other Governmental division taxes and assessments. Also, all contributions for unemployment compensation, health and welfare, old age benefits or other purposes now or hereafter effective during the term of the contract, and the Owner and Construction Manager shall not be liable for any additional charges therefore.

CRITICAL PHASING & STAGES OF CONSTRUCTION

1. INTRODUCTION

1.1 Critical phasing and critical stages of construction have been established herein for the project. It is extremely important that the "Critical Phasing & Stages of Construction" requirements be understood and complied with.

1.2 The Construction Manager shall coordinate detailed critical phasing and sequencing and scheduling with the Owner's representative.

1.3 The Construction Manager shall provide overall scheduling and coordination for the entire project. All Trade Contractors shall acknowledge the Construction Manager's right to establish and set up, or subsequently modify, the sequencing and scheduling of all Work on this project for the earliest completion and/or benefit to the Owner.

1.4 All Trade Contractors shall expedite the ordering and delivering of materials and equipment, etc. to meet these critical phasing and staging requirements and to make every effort possible to minimize disruption of normal building usage.

2. BID SCHEDULES

2.1 The preliminary construction schedule narrative included in the Contract Documents represents the general order and time frames for work to be followed by the Construction Manager in coordinating the project. Trade Contractors are to assume that their work will be coordinated in a manner consistent with industry practice, and the efficient coordination of all other trades. Trade Contractors recognize and accept their work may be sequenced and paced by other trades.

2.2 Please note that although the schedule defines the planned order of construction, Bidders should

not assume that any assurance is given or implied as to the calendar dates associated with completion of the work of a particular contract.

2.3 All Trade Contractors and Trade Subcontractors recognize and shall accept modifications to the schedule which are reasonable, in the opinion of the Construction Manager, for the general interest of the project as a result of allowable time extensions (formally or informally approved) in any contract, and such modifications are inherent to the construction process and shall not qualify as a basis for extra compensation from the Construction Manager or Owner.

2.4 The Trade Contractor, in submitting a proposal for the work of a particular work category, agrees to commit the necessary resources to complete the work activities of that work category, within a time span not greater than the planned duration. Work included within a work category, but not specifically defined by a particular work activity, is to be accomplished in a reasonable manner in conjunction with other work of the work category, and in such a way as to avoid complication of or to delay the work of other Trade Contractors.

3. PROJECT SEQUENCING

3.1 GENERAL SEQUENCING

3.1.1 The overall project sequencing is indicated within the Preliminary Construction Schedule. Refer to Section 00200 and Section 01310.

3.2 RESTRICTIVE SEQUENCING & SCHEDULING

3.2.1 More restrictive sequencing to coordinate the Owner's on-going operations and/or for the coordination of the various trades shall be identified in Section 00210 SPECIAL PROVISIONS or as otherwise directed by the Construction Manager; All Trade Contractors agree to cooperate and alter their operations to maintain these more specified restrictions and sequences of the work.

1. SPECIFIC PROJECT REQUIREMENTS

1.1.1.1. Refer to the work category description and WC-00 for specific information on scheduling requirements.

4. MUTUAL COOPERATION

4.1.1.1. Mutual cooperation between the Owner, the Architect, the Construction Manager, and the Trade Contractors to coordinate these construction and building operation requirements is anticipated and expected.

USE OF SITE

1. Trade Contractor shall limit his use of the premises for his work and for storage to allow for (I) work by other Trade Contractors; (ii) Owner occupancy; and (iii) public use.

2. Limitations on site usage as well as specified requirements that impact site utilization are indicated on the drawings and by other contract documents. In addition to these limitations and requirements, the Construction Manager will administer allocation of available space equitably among entities needing both access and space so as to produce the best overall efficiency in performance as the total work of the project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

3. ACCESS TO SITE

Use of Site: Limit use of Project site to areas indicated on sheet A1.01. Do not disturb portions of Project site beyond areas in which the Work is indicated.

Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

4. Trade Contractor shall assume full responsibility for the protection and safekeeping of products under his contract, stored on the site.
5. Move any stored products, under Trade Contractor's control, which interfere with operations of the Owner or separate Contractor.
6. Obtain and pay for the use of additional storage or work areas needed for operations.
7. Nonsmoking Building: Smoking and/or tobacco use is not permitted within the building or ANYWHERE ON THE TSD Campus. See Spec Section 01 35 13.22 "Special Schools Project Procedures".

OWNER'S RIGHT TO OCCUPY

1.1 The Owner, at his election, may from time to time occupy any parts of the project as the work in connection therewith is completed to such a degree as will, in the opinion of the Owner, permit of their use for the purposes for which they are intended. The Owner will, prior to any such partial occupancy, give notice to the Construction Manager thereof and such occupancy shall be based upon the following:

a. Such occupancy shall not constitute an acceptance of work not performed in accordance with the Contract Documents or relieve Trade Contractors of liability to perform any work required by their Contract but not completed at the time of occupancy.

b. Trade Contractors shall be relieved of all maintenance costs on the units or parts occupied under this agreement.

c. Owner shall assume the risk of loss with respect to any unit or part occupied under the terms of this agreement.

d. The Trade Contractor shall not be required to furnish heat, light and water or other such services used in the units or parts occupied, without proper re-numeration therefore.

HIGH PERFORMANCE BUILDING REQUIREMENTS

1. This project will utilize the State of Tennessee's High Performance Building Requirements – Section 018113 - Sustainable Design Requirements (Reference the Manual at http://tn.gov/assets/entities/generalservices/stream/attachments/HPBr_Documents.pdf)

Contract Considerations:

1. INSPECTION & TESTING ALLOWANCES

If inspection and testing allowances have been assigned to the Trade Contractors, the following shall apply:

1. Costs included in allowances
   a. Cost of engaging an inspection or testing firm, execution of inspection or tests, reporting results.
2. Costs not included in the allowance:
   1. Incidental labor and facilities required to assist inspection or testing firm.
   2. Costs of testing laboratory services required by Contractor separate from Contract Document requirements.
   3. Costs of retesting upon failure of previous tests as determined by Architect-Engineer.
3. Payment Procedures:
   a. Submit one copy of the inspection or testing firm's invoice with next application for payment.
   b. Pay invoice on approval by Architect-Engineer.
4. Funds will be drawn from inspection and testing allowances only by Change Order.

2. SCHEDULE OF VALUES

1.2.1 Submit schedule through Contractor's Trade Contractor Portal. Application for Payments cannot be processed until Schedule of Values is approved. Without prior approval of the Construction Manager, **no single line item can exceed $150,000. Unless indicated otherwise, allowances and change orders must be listed as separate line items.**

The schedule of values must be itemized as follows:

1.2.2 Format: Unless instructed otherwise, utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify bonds, insurance, and permits separately.

1.2.3 Allowances should be added as individual line items for each section in the Schedule of

Values.

1.2.4 Include within each line item, a directly proportional amount of Contractor's overhead and profit.

1.2.5 Approved Change Orders will automatically be added as a line item in the Schedule of Values through the Trade Contractor Portal.

1.2.6 HPBr Materials Submittal Form as required

3. APPLICATIONS FOR PAYMENT

1. Pay Applications are to be created and submitted through the Trade Contractor Portal which conforms to the AIA G702 Form. The Trade Contractor Portal is the exclusive method of submitting a payment application.

2. Payment Period: First of month to first of month unless agreed to otherwise.

3. Waiver of liens and Sworn Statements shall accompany all Payment Requests unless agreed to otherwise. Also to be produced and submitted through the Trade Contractor Portal.

4. CHANGE PROCEDURES

1.4.1 The Architect-Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by The Contract.

1.4.2 The Architect-Engineer may issue a change management document which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within five (5) calendar days.

1.4.3 The Contractor may propose a change by submitting request for change to the Architect-Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Sections 01600 and 01600A.

1.4.4 Stipulated Sum/Price Change Order: Based on change management document and Contractor's fixed price quotation; or, Contractor's request for a Change Order as approved by Architect-Engineer.

1.4.5 Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work, which are not pre-determined, execute Work under a change management document. Changes in Contract sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

1.4.6 Change Management Document: Architect-Engineer may issue a change authorization signed by the Owner, instructing the Contractor to proceed with a change in the Work,

for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.

1.4.7 Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect-Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.

a. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

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

c. Overhead and Profit: Overhead and Profit shall include the following:

d. Supervision, Superintendents, Commercial General Liability and Umbrella Insurances, Wage of Time Keepers, Watchmen and Clerks, Small tools with material value of less than $1,500.00, Incidentals, General Office Expense, and all other expenses not included in Labor Rates. The percentage fee for Overhead and Profit on the Contractor's own work shall be 15% of net cost. The percentage fee for Overhead and Profit on Subcontractor's work shall be 5%.

Allowances:

1. Allowances will be established as directed in the Work Category Descriptions and are required to be included within the Trade Contractor's base bid. The amount included is an actual cost and does not include overhead and profit. Overhead and profit shall be included in the Trade Contractor's base bid, not in the allowance. Charges against the allowances will be at the Trade Contractor's net rate without overhead and profit as it is already included in the Contractor's base bid. These allowances are set up to be used only when authorized by the Construction Manager. Labor charged against the allowances will be in accordance with mutually accepted labor rates listed in each Trade Contractor's respective contract. Work expended by use of the allowances may be billed for each month in the Trade Contractor's monthly billing provided proper documentation and allowance authorizations are provided. In the event a balance remains within a specific allowance at the end of the project, a change order will be issued deducting the balance remaining in the allowance from the Trade Contractor's contract. All savings as a result of the Trade Contractor's non-use of these allowances will be the Owner's.

Coordination:

1.1 PRE-INSTALLATION CONFERENCES: The Construction Manager shall hold pre-installation meeting at the project site well before installation of each unit of work, which requires coordination with other work. Installer and representatives of the manufacturers and fabricators who are involved in or affected by that unit of work, and with its coordination or interpretation with other work that has preceded or will follow shall attend this meeting. The Construction Manager will advise the Architect/Engineer of scheduled meeting dates.

1. The Construction Manager shall record significant discussions of each conference, and record agreements and disagreements, along with the final plan of action. The Construction Manager shall then distribute the record of meeting promptly to everyone

concerned, including the Owner and Architect/Engineer.

2. Do not proceed with the work if the pre-installation conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene pre-installation conference at the earliest possible date.

1.2 Installer's Inspection of Conditions: Require the installer of each major unit of work to inspect the substrate to receive work and conditions under which the work is to be performed. The installer shall report all unsatisfactory conditions in writing to the Construction Manager. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

1.3 Coordinate enclosure of the work with required inspections and tests so as to minimize the necessity of uncovering work for that purpose.

1.4 Mounting Heights: Where mounting heights are not indicated. Refer to the Construction Manager for decision. Products installed at a location not indicated or approved by the Architect or Construction Manager shall be relocated at the Trade Contractor's expense.

1.5 New utility connections shall be coordinated with local utilities and the Project Superintendent.

1.6 All Trade Contractors shall make arrangements with the Construction Manager before connecting to existing facilities. If interruption of service is required, it shall be done at the convenience of the Owner as scheduled by the Construction Manager / General Contractor.

Field Engineering:

1.1 Under the supervision and with the assistance of the Construction Manager, each Trade Contractor will be responsible for the layout of his particular portion of the work. Checking of layout and any assistance provided by the Construction Manager shall in no way be construed to relieve the Trade Contractors of their responsibilities for layout dimensions, tolerances, and accuracy of their work as set forth in the Contract Documents.

1.2 Each Trade Contractor shall carefully protect monuments, stakes, and benchmarks. If destroyed or disturbed by the Trade Contractor or his employees, the cost of replacing them shall be charged against the Trade Contractor and shall be deducted from the Trade Contractor's contract amount.

1.3 Except as otherwise noted, each Trade Contractor shall obtain his own field measurements and establish lines, grades, levels, and measurements shown on the drawings, and reconcile all measurements and conditions shown on the drawings with existing conditions at site, from the site survey provided and building corner indications and ground floor elevation designated by the Construction Manager.

1.4 Before custom fabricating any materials, the Trade Contractor shall verify all dimensions of any existing and new work, and shall be responsible for their accuracy. Any differences found shall be submitted to the Architect through the Construction Manager, for consideration before proceeding with the work. No extra compensation will be permitted because of differences between actual dimensions and measurements indicated on the project drawings.

Work Included:

1. All permits, fees, inspections and approvals required by governing jurisdictions are included within base bid. Coordinate well in advance (at least 24 hours), required inspections and testing with the Construction Manager. This will include liaison between state and local agencies to ensure code compliance and for securing approval for the facility.
2. Each Trade Contractor shall be held to have visited the site of the proposed work before submitting his proposal and to have familiarized himself with all existing conditions affecting the execution of his work in this project. No allowance or extra consideration on behalf of the Trade Contractor will subsequently be made by reason of failure to observe the site conditions, nor on behalf of any subcontractor for the same reason.
3. Excessive noise and vibration creating equipment shall be prohibited within close proximity of existing Structures/Buildings or occupied spaces. All proposed equipment scheduled for project shall be reviewed with the Construction Manager prior to delivery onsite.
4. At least two (2) weeks prior to starting on-site, meet with the Construction Manager, Architect and Engineer to discuss and resolve any issues relating to status of material procurements, site conditions, access, staging/storage requirements, safety, testing, sequencing and scheduling of work.
5. Any work that could interfere with existing owners operation, i.e. use of certain roads, parking lots, access to buildings, shall require pre-task planning with the Construction Manager and shut-down notification requests shall be prepared (72) hrs in advance of any work being scheduled. Pre-task planning shall review and discuss scheduling, coordination with Owner operations, working durations, safe practices and procedures.
6. Protect existing structures, equipment, and finishes, including new work in place, from damage during the performance of this work category. Any protection removed to facilitate other work shall be reinstalled / replaced by the trade needing access.
7. Prior to commencing with installation, verify all field conditions and measurements and report any discrepancies to the Construction Manager.
8. Whenever possible all embeds to be furnished to other trades shall be fabricated / modified by the providing contractor with holes / tabs, etc to allow easy for installation by the installing contractor.
9. Provide full-time on-site supervision during the performance of your work. Supervision will be responsible for coordination, scheduling, safety, manpower, and other activities necessary to achieve safety, quality and scheduling requirements set forth under this work category. Supervision shall not be removed from this project without prior written consent and approval of the Construction Manager.
10. Full compliance with all site specific rules and regulations, including (but not limited to) OSHA, State Authorities, Local Authorities, and the Construction Manager. This subcontractor shall submit, prior to performing any work on-site, a copy of their site specific safety program/manual.
11. Should Subcontractor require on-site trailer or storage units, Subcontractor shall obtain approval from the Construction Manager on size, count and where to locate, prior to delivery on-site. Subcontractor to arrange and pay for service to trailers, including (but not limited to) electrical, phone, etc.

12. For material deliveries, if traffic control is required, Subcontractor to arrange manpower accordingly and provide signage, barricading, flagman etc., necessary for the safe performance of own work and protection of the public. Staging, storage on-site, and all deliveries required to support this installation must be reviewed and approved in advance by the Construction Manager.

13. Furnish and receive all required materials and deliver FOB jobsite. All deliveries shall be closely coordinated with the Construction Manager and 72 hour advance notice shall be given prior to delivery. Unless noted otherwise, deliveries must be coordinated to be complete with unloading during normal working hours.

14. This subcontractor will receive and handle all respective material and properly store/protect before, during and after installations. Excessive and out-of-sequence deliveries will be prohibited and subject to re-handling and removal offsite as directed by the Construction Manager.

15. Unless noted otherwise, furnish all hoisting, lifting, scaffolding, and handling to complete your own work.

16. Hoisting of materials and equipment over occupied areas will not be permitted, unless areas below are vacated or occupancy access is controlled during lifting. Each subcontractor will be required to notify Construction Manager seven (7) days in advance of required hoisting over occupied areas. Pre-Task planning and shut-down notifications will be required to assure minimum interruptions to Owner operations. In general, any hoisting equipment required to be used on-site must be reviewed in advance with Construction Manager for coordination of site logistics, safety procedures (including FAA approvals if required), access, lift swing areas, duration and overall activities relating to this hoisting equipment.

17. Approved O&M manuals are required at least 2 weeks prior to equipment start-up, start of warranty, and Owner training, but no later than thirty (30) days prior to substantial completion.

18. In the event of any jurisdictional or labor issues, the subcontractor assigned the work shall arrange to complete all work as required to avoid any interruptions/continuity of work on this project at no additional cost. All labor requirements pertaining to the project will be met.

19. Cooperate fully with representatives from Architect, Engineer, Owner, Construction Manager and independent testing agency, and allow for in progress inspections, including providing access to areas of work, when required.

20. This project may require multiple phases, which will require re-mobilization. All costs for multiple phasing shall be included.

21. Each Trade Contractor shall assume full responsibility for all pre-ordered products after their arrival at this designated location. This includes transportation, storage, start-up, warranty services, and installation in accordance with the General Conditions unless otherwise specified.

22. General project area lighting will be provided by WC-28, however any specific task lighting is to be provided by the individual trade contractor requiring the additional light.

23. **REFERENCE THE SITE ACCESS PLAN AND SITE LOGISTICS PLAN FOR ALL TRADES LOCATED AT THE END OF THESE WORK CATEGORIES. ALL CONSTRUCTION TRAFFIC, DELIVERIES, ETC TO FOLLOW THE ROUTES ESTABLISHED ON THESE PLANS TO ACCESS THE JOBSITE.**

End of Work Category No. 00

Work Category No. 01C – Demolition

Work Included:

The subcontractor shall timely perform all Demolition work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

024119 – Selective Demolition

Work Category 00

Work Category Notes:

1. Complete demolition and off-site disposal of all items of work as shown and/or specified except as noted below. Includes all architectural, structural, mechanical, and electrical demolition. Removals to include, but not limited to, concrete walls, saw-cutting of concrete and masonry walls/foundations, steel framing, existing equipment, cabinets, ceilings, flooring, piping, conduit, etc. Includes all labor, material, accessories, and equipment to complete this work.
2. Coordinate scheduling and sequencing of this work with mechanical, electrical, and other contractors for power and utility shutdowns, capping, and continuation of utility services as required. Coordinate scheduling and sequencing of work with other trades. Contractor shall acknowledge and adhere to the construction schedule and sequencing.
3. Furnish and install all hoisting, scaffolding, temporary platforms, chutes, etc., as required for the performance of this work.
4. Final clean-up of this work includes broom sweeping.
5. Remove and relocate all items designated to be returned to owner to a location on site as determined by the owner and/or general contractor.
6. Provide, maintain and remove barricades, signage, and other safety precautions that may be required where removal of equipment and/or structure leaves unsafe conditions.
7. Coordinate cutting of masonry openings with the mason contractor where saw-tooth cutting is required.
8. Provide, maintain, and remove temporary partitions, dust control, and negative exhaust for work adjacent to occupied buildings. Take precautions and provide measures to protect the public and fellow workers during the performance of this work. Protect existing structures, utilities / drains, equipment, flooring, and other finishes from damage during the performance of this contract.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *This Trade Contractor is to include demolishing the existing Poor Hall structure onsite as follows:*
   A. *All concrete and masonry is to be demolished to pieces no larger than 18" x 18" x 18" and stockpiled in a location onsite to be determined at the sole discretion of the Construction Manager. This material will then be crushed by the Grading Contractor (WC 02) and used as fill material.*

B. *Remaining items are to be disposed of by the demolition contractor per the Construction Waste Management Plan. This contractor is to include the cost to haul offsite, recycle this material, and provide the necessary documentation to demonstrate what is diverted from landfill waste per HPBr requirements.*

2. *This contractor is to include demolishing the existing Dining Hall structure as follows:*

A. *All items are to be disposed of by the demolition contractor per the Construction Waste Management Plan. This contractor is to include the cost to haul offsite, recycle this material, and provide the necessary documentation to demonstrate what is diverted from landfill waste per HPBr requirements.*

3. *The owner reserves the right to any salvage value for materials being demolished.*
4. *Testing for hazardous materials has been performed by the owner. Reports from this testing will be made available for the successful bidder. No hazardous material abatement is to be included at this time.*
5. *This contractor is to demolish all components of existing structures, including foundations. Foundations are to be backfilled by this contractor immediately after removal.*
6. *Demolition by this contractor will include all Mechanical, Electrical, Plumbing, Fire Protection, and any other building systems. Cutting and capping any active utilities will be by the other respective trades (WC 26, 27, & 28).*
7. *This contractor is to provide water for dust control during demolition activities. Connection to water onsite will be provided by WC 27 at a location to be determined. This contractor is to provide means of conveyance to their work area and misting equipment.*
8. *Access to and from the site will only be permitted as shown on the logistics plan.*

Related Work by Others:

1. Demolition of site utilities and site structures (i.e. paving) by WC 02.
2. Cutting and capping of utilities by WC 26, 27, and 28.
3. PCB's, asbestos, lead paint or other hazardous material removal by Owner.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 01C

Work Category No. 02 – Earthwork and Site Utilities

Work Included:

The subcontractor shall timely perform all Earthwork and Site Utility work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

All of Division 31 Sections

329219 – Seeding

All of Division 33 Sections

Work Category 00

Work Category Notes:

1. Demolition and clearing/grubbing of the entire site, including, but not limited to, the removal of trees, tree roots, topsoil removal, vegetation and deleterious materials as shown or specified, hard surfaces, fences, handrails, retaining walls, posts, gates, signs, etc. Includes all labor, material, accessories, and equipment for a complete installation. The existing Poor Hall and Dining Hall structures will be demolished by WC 01.
2. Provide all utility demolition as shown or specified including, but not limited to water lines, fire lines, concrete pipe, hydrants, backflow preventors, sewer and storm cleanouts, pipe, and manholes, irrigation pumps, monitoring wells, access ports, etc.
3. Provide all necessary items for complete construction and relocation of the water systems to within 5' of the building as shown or specified including all associated structures, manholes, pressure testing, bacteria testing, flushing, drain basins, meters, backflow preventors, wet taps, temporary piping, valving and capping in existing piping for permanent and final connections, demolition and re-working of existing (as called out per the plans), concrete thrust blocks and restraints, inspections, testing and certifications, and all agency fees and agency work as required.
4. Furnish and install all piping, structures and accessories required for the performance of the storm and sanitary work to within 5' of the building as shown or specified including all associated structures, as required. Clean the systems upon completion of the work and prior to acceptance by the Owner. Include final adjustment of structures to match final grades.
5. Provide all mass excavation, grading, compaction, backfill, berms and off-site borrowed fill to final subgrade elevations as shown or specified, including backfill required around the building foundations, foundation walls, retaining walls, sidewalks, curb and gutters, drives, asphalt paving, etc. This is to include all rough and final grading to +/- 0.1'. All unsuitable soils and materials shall not be permitted to be stockpiled and must be removed on a daily basis.
6. Coordinate and develop soil erosion plan with the Construction Manager for submission to appropriate jurisdiction. Furnish and install soil erosion control measures as shown and/or specified. Maintain soil erosion control measures during the course of this project. Remove erosion control and clean all catch basins and/or pipe as required at completion of project. All inspection logs to be copied directly to the Construction Manager and copies shall be kept within a soil erosion control manual, located within the

Construction Manager's trailer.

7. Provide all cutting, patching and repairs by a qualified person as required of existing roadways, landscape areas, paving, hardscape, etc. disturbed by this scope of work.

8. Provide all required tree protection, sedimentation and water pollution control shown, specified or necessary to perform the work in this package or the work of others, including maintenance and removal upon completion and acceptance of work by the governing agency.

9. Provide all dewatering (ground and rain water) as necessary until final grade and complete and operational storm system is available. All ground water will be diverted so as not to interfere with construction or public traffic flow and the operations of the existing facility. All drainage inlets shall be protected as specified. Maintenance of dewatering system to be considered a 24 hour/7 day week assignment.

10. This subcontractor shall participate in all coordination meetings (internal and meetings with local agencies and those having jurisdiction) concerning the relocation of existing utilities so as not to impact the existing facility operations. Include temporary utilities and provisions as necessary to allow relocation of existing utilities without interruption of service to existing facilities. This contractor to provide for temporary support and protections for any existing utility or other piping encountered during performance of this work. Include verification of existing utility locations prior to excavations, and monitoring during excavation and backfill.

11. Provide all right-of way bonds, etc. as required by city, county, and state agencies relative to the work within this package.

12. Prior to any imported soils entering project site, provide material analytical soils reports and documentation that material is free of contaminants/hazardous materials.

13. Clean roads and staging areas of any tracking dirt or debris generated during site clearing, excavation, earth retention, foundations/slab-on-grade and caisson activities as necessary or as directed by the Construction Manager. Perform dust control and street cleaning on a regular basis as job conditions require.

14. Furnish and install all under-drain/foundation drainage systems as shown and specified.

15. Strip and stockpile topsoil for re-use. Re-spread topsoil to within specified tolerances, upon completion of rough grading. Large clumps of dirt and stones shall be removed from topsoil.

16. Where existing asphalt paving is removed for new utilities place compacted aggregate base to bottom of asphalt for asphalt patch by others. If asphalt cannot be patched immediately, place aggregate to top of adjacent asphalt. Remove additional aggregate at such time when asphalt can be placed.

17. Install irrigation sleeves; coordinate location with WC 08.

18. Install, maintain, and remove temporary roads for concrete & delivery trucks to move under their own power by WC 02.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *This contractor will be responsible for providing a final as-built BIM model per spec section 01 31 13.23. This model will include the as-built location of all utilities and final grades for the project.*

2. *This contractor is to include the cost to crush concrete and masonry demolition waste from Poor Hall* ***onsite*** *to be*

used as fill material per the direction of the Geotechnical Engineer.

3. *The asphalt base and surface of the existing parking lot at the new high school may be fractured and left in place per the direction of the Geotechnical Engineer. Curbs, Storm Structures, Utilities, etc. must be removed as indicated.*
4. *Temporary construction entrances for the High School Area, Dining Hall Area, and onsite borrow pit area are to be installed and maintained by this contractor.*
5. *This contractor is responsible for providing all erosion control necessary at the borrow area.*
6. *This contractor is to provide 4" of #57 stone in the area of each building pad plus a 10' perimeter around the face of building. 4" of #57 stone is also to be provided by this contractor in the high school parking lot as temporary lay down area. At the onsite borrow pit, 4" of #57 stone is to be provided for additional parking of construction workers and onsite storage trailers once fill material is removed and the new flattened area is established.*
7. *This contractor is to provide 6" of #57 stone to the area defined as crane access on the site logistics plan.*
8. *This contractor is to include designing, furnishing and installing all site retaining walls, including earth retention as necessary to install them. Design is to be performed by a Professional Engineer registered in the State of Tennessee. Retaining walls to be backfilled by this contractor.*
9. *This contractor is to provide the downspout drainage to the building and provide and install the downspout shoes noted on detail 21 on sheet C9.*
10. *This contractors is to provide all items depicted in details 28 and 29 on C10 for the blow off assemblies and air release valves.*
11. *This contractor is to include all site fire lines, hydrants, PIV's, etc., including all components listed on in the Civil Details for the site fire line and assemblies. Fire line to be stubbed up inside the building 2' AFF as shown by this contractor after coordinating with WC 26 for the specific riser location.*
12. *All utilities, with the exception of the fire line described above and downspout drains, are to be run to within 5' of the building line for connection by other trades.*
13. *This contractor is to provide a means of washing the wheels of trucks prior to leaving the jobsite and is responsible for cleaning up and dirt, debris, etc. that becomes present on sidewalks, roadways, and storm systems until the time that this contractor demobilizes from the site. The means of washing the wheels of trucks shall remain in place until deemed no longer necessary by the Construction Manager, at which point it is to be removed by this contractor.*
14. *Temporary Barriers, Fences, Traffic Control, and other safety measures are to be provided by this contractor for any work taking place outside the site fence as shown on the site logistics plan.*
15. *See Sheet P5.10. WC 27 will provide Grease Waste, Sanitary and the Grease Interceptor. This contractor to continue piping from the Wye downstream of the grease interceptor.*

<u>Related Work by Others</u>:

32. Refer to Sections 00210 and 01019 for testing requirements and responsibilities.
33. Final connection of utilities (sewer, water and gas) from 5' outside of building and all work inside of the building by W.C. 26, 27, and 28.
34. Mechanical and electrical contractors will perform excavation, backfill, compaction and removal of spoils within the building, as needed.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $50,000 for the construction of temporary access roads undefined at this time. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

Unit Price #1 – Remove and Replace Unsuitable Soils in Open Excavation ($/CY)

Unit Price #2 – Remove and Replace Unsuitable Soils in Trench Excavation ($/CY)

Unit Price #3 – Remove and Replace Rock in Open Excavation ($/CY)

Unit Price #4 – Remove and Replace Rock in Trench Excavation ($/CY)

Unit Price #5 – As an additional price to items 1 - 4 above, provide #57 stone in lieu of suitable soil ($/CY)

Unit Price #6 – As an additional price to items 1 - 4 above, provide flowable fill in lieu of suitable soil ($/CY)

End of Work Category No. 02

Work Category No. 06 – Asphalt Paving

Work Included:

The subcontractor shall timely perform all Asphalt Paving, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

321216 – Asphalt Paving

321600 – Curbs & Gutters

321723 – Pavement Markings

Work Category 00

Including, but not limited to the following:

1. Furnish and install all bituminous paving including specified base stone, binder mix, surface mix, sealers, joint filler, etc as indicated on the drawings and specifications. Includes all labor, material, accessories, and material for a complete installation.
2. Furnish all layout and controls for this work category by a qualified surveyor. This work category will be responsible for coordinating with WC 02 and WC 10 on all layouts, for this work category, throughout the duration of this project.
3. Saw cut and prepare edge for patch work/new work. Complete all patching of asphalt paving to match existing conditions in surrounding streets necessary for the curb cuts at new entrances and exits.
4. Coordinate installation of manhole and catch basin covers prior to installation of asphalt work, including all final adjustments of manhole and catch basin castings by WC 02.
5. Provide final grading and proof roll aggregate base for approval and acceptance prior to installing base course. Identify soft spots and bring to the attention of the construction manager. All repairs will be performed by WC 02.
6. Broom cleaning will be required between base and final course of paving.
7. Provide line striping and markings for finished project; complete all cleaning and layout required for pavement markings.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Provide all machine formed curbs noted on the drawings.*
2. *Assume binder will be placed in areas as soon as possible in the Construction Schedule and final topping will occur later with a separate mobilization. All areas will not be available at once. Multiple mobilizations will be required to place binder and then subsequently topping.*
3. *Provide flagmen and signage as needed while paving operations take place outside of the site fence shown on the site logistics plan.*

4. *Provide and install parking lot signage noted on Civil Drawings.*
5. *Base Course or Binder will be utilized during construction. Provide cleaning as needed prior to placement of final topping.*

Related Work by Others:

1. Refer to WC-00 for testing requirements responsibilities.
2. Final adjustment of catch basin castings by WC 02.
3. Concrete sidewalks, concrete paving, integral formed curbs by WC 10.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $75,000.00 for temporary access roads and miscellaneous asphalt patching and repair not indicated on drawings. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 06

Work Category No. 07 – Fencing

Work Included:

The subcontractor shall timely perform all Fencing work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

Work Category 00

Work Category Notes:

1. Furnish and install temporary fencing shown on the site logistics plan. Includes all material, labor, accessories, and equipment for a complete installation.
2. Protection and cleaning of walkways, parking lots, drives, etc. during and at the completion of this work. Includes removal of spoils.
3. Field verification of underground piping, electrical conduit, site utilities, etc., prior to digging, trenching, plowing or spading operations.
4. Include all layout, staking, and auger work.
5. Fencing shall not use existing buildings or other existing structures as support. Fencing must be an independent entity.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Include sliding type gates at entrances noted on site logistics plan. Include (3) other 10' gates to be located at a later date by the Construction Manager. Note that Dining Hall fence will be installed at a separate mobilization.*
2. *Temporary fencing noted on Site Logistics Plan is to be 6' tall chain link with top and bottom wire, posts to be driven,.*
3. *In addition to the temporary fencing shown, provide 200' of moveable panel fencing with stands.*
4. *Replace 20' section of TSD Campus Fence where old construction entrance is to be removed.*
5. *Provide Dumpster Gates per Details 1 and 2 on Sheet AS1.10.*
6. *Remove and dispose of all temporary fencing at the request of the Construction Manager.*

Related Work by Others:

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $7,500 for temporary fencing undefined at this time. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 07

Work Category No. 10 - Concrete

Work Included:

The subcontractor shall timely perform all Structural and Site Concrete work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

033000 Cast-in-place Concrete

031513 PVC Waterstop

072616 Below Grade Vapor Retarders

321313 Concrete Paving

321600 Curb and Gutter (As it relates to non machine formed items)

Work Category 00

Work Category Notes:

1. Furnish and install all cast-in-place concrete as shown and/or specified including but not limited to foundations, slab-on-grade, elevated slabs and elevated slabs on metal decks, tank structures, mud mats, caisson caps, equipment pads, and stair treads and landings.
2. Includes re-steel, foundation waterproofing, waterstops, pre-molded joint filler, bonding agents, vapor barriers, perimeter foundation and below slab rigid insulation, grouting of structural steel leveling & base plates, expansion and control joints, floor sealers and hardeners, curing compounds, drilling and grouting of dowels, fine grading under slabs-on-grade.
3. All grouting as shown and specified including pump/equipment bases, steel base plates, and grouting of steel beam floor reinforcing.
4. Includes installation of anchor bolts, embeds, dovetail anchors, floor doors, roof hatches, unitstrut, and sleeves embedded in structural concrete supplied by others. Coordinate and assist other trades in setting sleeves in formwork. WC 12 will perform an anchor bolt survey – complete timely repair any deficiencies found prior to mobilization of the Structural steel contractor.
5. Includes all forming, placing, finishing, reinforcement, finishing as required, setting, shoring, recesses for other work, dowels, manhole steps, epoxy adhesives.
6. Includes all required layouts for the performance of this W.C. All surveying necessary to establish proper layout and elevations are the responsibility of this work category.
7. Prior to pouring the elevated slabs it will be this work category's responsibility to insure all openings around columns and mechanical chases are properly platted/closed off so that concrete does not spill into the lower level. Also visual inspection of the perimeter angle (pour stop) at the point the concrete meets the steel will need to be inspected and reviewed with the superintendent prior to pouring.
8. Provide block outs for other trades as shown in contract documents and approved by the construction manager.
9. Furnish, install and maintain temporary winter protection/enclosures and heat for this work categories

work activities. This includes fuel, equipment, maintenance and safety provisions to continue and complete this work in an uninterrupted manner, despite weather conditions.

10. Floor finish tolerances (i.e. flatness and levelness requirements) to be installed to meet requirements of specifications. Provide a concrete survey to confirm pours are within the specified tolerances prior to demobilization.

11. This contractor is responsible for the subgrade protection from frost, water, etc once excavation for concrete is complete and forming is to proceed. This includes dewatering.

12. Furnish and install column isolations in slab-on-grade. Remove form work, backfill and pour concrete around the columns after steel erection is complete. Provide temporary covers at each of these locations until the concrete is poured.

13. Provide engineered shoring system for supported cast in place concrete walls and formed supported slabs as specified, including all engineering of and installation of any required reshoring.

14. Provide safety guardrails for all formed supported elevated slab edges/openings and provide covers for all floor openings as required.

15. All concrete embedded items, which are furnished by others, shall be installed, received, inventoried, unloaded, handled and protected by this work category, i.e. Steel, Pre-cast and Curtain wall embedded items, inserts, anchor bolts, Elevator embeds, misc. iron embeds etc., shall be clearly marked and labeled per approved and previously provided erection drawings, and be appropriately delivered (FOB jobsite) to this subcontractor for installation.

16. Any saw cutting, grinding, chipping and patching work etc. generating concrete dust, shall be approved in advance by the Construction Manager. Dust control and safety procedures will be reviewed and enforced during this activity.

17. Grout elevator door sills, after final positioning. In-fill elevator pit floor slab opening after jack & casing has been placed.

18. Clean metal deck of unidentifiable debris prior to placement of concrete.

19. Drill and epoxy dowels into existing concrete structures as required.

20. Create, maintain, and remove concrete waste from concrete wash out pit(s) in a location agreed to with the Construction manager for the duration of this trades work.

21. Furnish and install all cast-in-place concrete as shown and/or specified including but not limited to sidewalks, curbs and gutters, concrete stairs, concrete paving, concrete planters, bollards, frost walls, and supported slabs. Includes all labor, material, accessories, and equipment for a complete installation.

22. Furnish and install joint sealants, curing agents, sealers, and/or expansion joints at curbs, sidewalks, and concrete paving. Protect work until sealants have cured.

23. Complete fine grading and compaction under all drives, walks, curbs, and gutters.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Furnish and install foundation drainage along footings and backfill footing excavation along inside and outside of*

cast in place concrete and masonry walls and stem walls as indicated on drawings. Run drains to locations outside of footing and tie into closest roof drain line provided by WC-02.

2. *Provide dewatering of foundations until walls are in place and backfilled.*
3. *Excavate all foundations, including the elevator pit and place and compact spoils in areas onsite to be determined by the Construction Manager. This contractor is to backfill foundations when directed by Construction Management.*
4. *This contractor to furnish and install base stone as specified under all slabs on grade, concrete pads, drives, and walks.*
5. *This contractor is responsible for following all requirements for concrete curing and protection measures due to Hot or Cold Weather to allow the work to continue on schedule.*
6. *Provide and Install all bollards, dumpster pad footings and slabs, stairs, concrete paving, concrete sidewalks, dumpster pads, and mechanical and electrical pads as required by the Contract Documents.*
7. *Provide joint fillers and sealants for all site concrete as noted in Civil Drawings. Provide same at all intersection of site concrete and adjacent walls.*
8. *Furnish and install Termite Treatment in sequence with prepping slab on grade.*
9. *Furnish and install all housekeeping pads and grout elevator sills.*

Related Work by Others:

1. Furnish anchor bolts and leveling bases by WC 12.
2. Concrete materials testing and periodic "in progress" field inspections by Testing Agency. However, if excessive re-testing is required, this subcontractor will be assessed re-testing costs.
3. Utility thrust blocks and concrete encasement of site electrical by WC 26, 27, & 28.
4. Cavity wall insulation by WC 11.
5. Reinforcing steel contained entirely within unit masonry by W.C. 11.
6. Embedded items in concrete furnished by others.
7. De-watering of all excavations to be performed by WC 02 until forming begins.
8. Roof Drains and Downspout Drainage by W.C. 02.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $15,000. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 10

Work Category No. 11 - Masonry

Work Included:

The subcontractor shall timely perform all Masonry work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

042000 – Unit Masonry

044200 – Exterior Stone Cladding

072100 – Thermal Insulation

079200 – Joint Sealants (As it relates to this scope)

Work Category 00

Work Category Notes, including, but not limited to:

1. Furnish and install all brick/masonry assemblies, stone assemblies, concrete masonry units, cast stone caps, precast items, necessary anchoring of unit masonry work to structural and miscellaneous steel, weeps, and vents. Includes all labor, material, accessories, and equipment for a complete installation.
2. Furnish and install horizontal and vertical masonry wall reinforcement, anchors, through wall flashing, bond beams, insulation, dampproofing, fire safing (including perimeter of walls), top of wall plates, sealants, caulking, expansion joints assemblies and covers, compressible fillers, expansion joint fillers, and isolation material.
3. All through wall flashings shall be inspected by local building authority (if applicable) and Construction Manager prior to being concealed.
4. Receive, handle, set and grout all hollow metal doors frames, windows and elevator hoist way frames at masonry walls provided by others. For door frames required to be left out for access, leave oversized opening and tooth in masonry when directed by Construction Manager.
5. Furnish and install access panels if shown in masonry walls. Install all access panels in masonry as may be provided by others.
6. Cooperate and coordinate masonry Work with other trades for proper locations of rough-ins and penetrations thru masonry walls. Coordinate with structural steel contractor regarding location and size of tie-in points for steel bearing on existing masonry walls. Required preparation of openings including cutting of block, grouting of walls, and installation of bearing plates by this contractor.
7. Include sawcutting and necessary patching where the removal of brick is required for structural tie-in or for corridor penetrations. All saw cutting needs to be wet cut to help reduce dust.
8. This work category will be responsible for review/coordination of approved shop drawings such as the curtain wall system, door and window openings, etc, prior to work taking place. These documents can be obtained for review from the Construction Manager.

9. Provide required brick and stone samples as well as a mock-up wall as indicated in the specifications, to be reviewed and approved by the architect and owner prior to construction starting for this work category.
10. Masonry wall cavities and top of walls shall be covered and protected each day.
11. Furnish, install and maintain temporary winter protection/enclosures and heat as required for proper installation of this contractor's work. This includes fuel, equipment, maintenance and safety provisions to continue and complete this work in an uninterrupted manner, despite weather conditions.
12. Clean and wash all masonry and stone as specified and in accordance with approved sample. Protect any finished products from the cleaning agents.
13. Protect any new and/or existing adjacent surfaces, including from overspray of insulation, waterproofing, dampproofing, or mortar droppings.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Provide and install all components of the masonry wall types including, but not limited to, cavity insulation, through wall flashings, mortar nets, drip edges, weeps, and vent.*
2. *Furnish and install all rebar, CMU fill, metal embedded lintels, masonry wall angle supports, anchors, steel lintels, counter flashing reglets, roof counter flashing, etc. to be installed in masonry. Includes final adjustment of items including where masonry walls abut metal deck or steel members.*
3. *Receive and install all embed plates for structural steel items to be provided by WC 12.*
4. *Provide masonry items as outlined above for site masonry as indicated on civil and architectural plans, including but not limited to, the dumpster pad screen walls and mechanical area screenwall.*
5. *Provide block outs in interior masonry walls based on sizes and locations provided by other trades for MEP penetrations as necessary.*
6. *Provide and install all items associated with the stabilization of masonry walls called out in detail 10/S4.02..*
7. *Provide temporary bracing of masonry foundation walls as noted in detail 3/S3.04. This bracing is required wherever a masonry wall to be backfilled is greater than 3' in height. Bracing is to remain in place until floor slab above is placed. Remove bracing at the direction of the Construction Manager.*
8. *Furnish and install all CMU grout fill inside cells and between brick and CMU at foundation up to grade level.*
9. *Lintels supporting brick attached directly to and supported solely by structured steel will be furnished and installed by WC 12. Loose Lintels and/or Lintels attaching to anything other than structural steel will be furnished and installed by this trade contractor.*
10. *Provide and install drip edge coping shown in Detail 3 on A5.50 and all other similar conditions.*

Related Work by Others:

1. Segmented Block Retaining Walls by WC 02.

2. Embed Plates for Structural Steel by WC 12.
3. Waterproofing and Caulking by WC 13.
4. Installation of roof flashing (parapet caps) by WC 14.
5. Installation of Metal Coping by WC 14.
6. Exterior joint sealants by WC 13.
7. Hollow metal frames furnished by WC20B.
8. Elevator frames furnished by WC 30.
9. Grouting of frames in metal stud walls by WC 21.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $10,000. Reference Work Category 00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 11

Work Category No. 12 - Structural Steel

Work Included:

The subcontractor shall timely perform all Structural Steel, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

051200 – Structural Steel Framing

052100 – Structural Joist Framing

053100 – Steel Decking

055000 – Metal Fabrications

055100 – Steel Stairs

055213 – Pipe and Tube Railing

057300 – Decorative Metal Railing

Work Category 00

Work Category Notes, including, but not limited to:

1. Furnish and install all structural steel, steel joists, floor decking, cellular floor decking, roof deck, miscellaneous metals, sump pans, ornamental metals, grating, steel stairs, ladders, cages, metal fabrications, sump pans, leveling plates, shear studs, pipe bollards, hand rails (interior and exterior), guardrails, etc., indicated by the contract documents (not just limited to the structural drawings) or as required for a complete installation, including labor, materials, equipment, adhesives, fasteners and accessories.
2. Furnish only all embedded items including, but not limited to, steel lintels, angles, stair nosings, anchor bolts, pipe bollards, etc., indicated by the contract documents (not limited to the structural drawings).
3. All specified coating for ferrous metals, galvanized metals, and aluminum are required and are the responsibility of this work category. Field touch up of shop paint as required. Shop preparation and painting of all structural and miscellaneous metals as indicated on the contract drawings.
4. Submittal of all required detailing to allow for architect/engineer review and approval, corrections, fabrication, and delivery without impacting the construction schedule.
5. Provide all necessary welding and mill certificates as required by the contract documents or as requested by the Construction Manager.
6. Field dimensions and measurements as required for this work. Prior to fabrication and erection contractor shall verify existing conditions and anchor bolt locations through means of a qualified surveying company to field survey the site and submit results to the construction manager for review. Any errors or discrepancies need to be identified in writing. Corrections will be made by the contractor responsible for the original installation. Cost for all field visits/surveying must be in proposal.
7. This contractor shall provide the construction manager with all necessary crane/hoisting information (size). This information will be used to prepare the site for the equipment mentioned by this contractor. Four weeks prior to site mobilization, meet with the Construction Manager, Architect and Engineer to

discuss and resolve any issues relating to status of material procurements, site conditions, access, staging/storage requirements, material testing program and scheduling.

8. Temporary water and power **will not** be provided for the work of this subcontract. Subcontractors should make provisions for portable generators and welders as required to perform their work.

9. For areas shown to receive paint, intumescent paint, or spray-on fireproofing, this subcontractor shall ensure metal decking and steel framing is free of oils or any other materials that could jeopardize adhesion of spray-on fireproofing or paint.

10. Furnish, install and maintain safety barricades for this work at all times. If this subcontractor creates an opening or leading edge that creates a fall hazard, perimeter protection/guardrails shall be promptly installed by this subcontractor. Fall protection shall satisfy all safety requirements. If this subcontractor requires existing fall protection to be removed or modified, seek prior approval from the Construction Manager, adjust fall protection as needed and promptly restore fall protection to original condition. This subcontractor shall install perimeter protection to meet safety standards before and after concrete decks are poured. Once this subcontractor has completed respective work, an inspection of all perimeter protection shall be conducted by the Construction Manager, and all identified deficiencies shall be corrected by this subcontractor. Perimeter roof protection/guardrails similar to above, shall be furnished and installed by this subcontractor, constructed and located, as approved by the Construction Manager prior to installation. All perimeter guardrails/protection shall be removed by others as permanent walls and details are constructed.

11. Coordinate penetrations and related framing with other trades during detailing phase. Provide framing plans to mechanical for verification.

12. Provide a completed structural steel model to the CM to be used for the 3D Building Information Modeling process. Include all structural and miscellaneous steel shown and specified in the model.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Lintels supporting brick attached directly to and supported solely by structured steel will be furnished and installed by this contractor. Loose Lintels and/or Lintels attaching to anything other than structural steel will be furnished and installed by WC 11.*

2. *This trade is to furnish all hoisting, rigging, and equipment as necessary to complete the work.*

3. *See site logistics plan for site layout and stone laydown areas outlined to be provided by WC 02 (See also the description in WC 02). If additional laydown, gravel, crane roads, etc. are necessary, they are to be furnished by this contractor.*

4. *This contractor will install all anchors and bracing for structural steel elements. Masonry top of wall bracing will be furnished and installed by WC 11.*

5. *This contractor is to furnish and install metal roof decking on top of light gauge roof trusses furnished and installed by WC 21. Include all 12 gauge bent plate noted in details pertaining to this roof.*

6. *Provide and install framing for roof and floor openings per details 2 and 3 on S4.03 and 1 on S4.02. Provide these for all openings shown on Structural, Architectural, and MEP Roof Plans.*

7. *Provide and install wind girt shown in 13/S4.04.*

8. *Any metal items connected by welds called out on structural drawings are to be provided and installed by this contractor.*
9. *Provide and install the following Elevator related steel items: pit ladders, shaft hoist beams, sill support steel, sump pit grates.*
10. *Provide all Miscellaneous Metals shown on Civil Drawings for stairs, handrails, and bollards. Note that this contractor is to furnish and install three line pipe handrails on site retaining walls that exceed 30" in height.*
11. *Provide and install Ornamental Stair and Balcony Handrail/Guardrail at 5/A7.01.*
12. *Provide and install all handrails at stairs and ramps (See A7.51 and similar).*
13. *Provide and install all wall mounted rails similar to 3, 4, and 5 on A7.10.*
14. *Provide and install roof access ladders as shown.*

Related Work by Others:

1. Grouting of leveling or base plates by WC 10.
2. Reference WC-00 for testing requirements and responsibilities.
3. Finish painting of steel by WC 24.
4. Light gauge framing by WC 21.
5. In-fill of stair treads and landings by WC 10.
6. Installation of embeds by WC 10.
7. Roof and floor hatches by WC 14. Framing to Support these items is by this Work Category.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $15,000 for miscellaneous steel supports. Reference WC 00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 12

Work Category No. 13 – Caulking & Waterproofing

Work Included:

The trade contractor shall timely perform all Caulking and Waterproofing work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

071113 - Bituminous Dampproofing

071326 - Sheet Waterproofing

079200 - Joint Sealers

Work Category 00

Work Category Notes:

1. Furnish and install all backer rod as needed for this scope of work.
2. Furnish and install all preformed joint seals for this scope of work.
3. Furnish and install all caulking (interior and exterior) complete. Includes but not limited to; masonry control joints, limestone joints, caulking at dissimilar materials, sidewalk expansion and control joints, stairwell landing perimeter joints, perimeter joints at louvers, perimeter joints of doors and windows (interior and exterior), metal copings to building, overhead door jambs, etc.
4. Testing and mock-ups required.
5. All jobsite safety measures per project specific safety manual.
6. Provide all scaffolding, ladders, hoists, etc. to perform this scope of work.
7. Coordinate with other trade contractors.
8. Submit a comprehensive submittal package within 90 days of receiving award of contract. Submittals and any requests for information, along with the necessary forms will be submitted using the construction manager's project website.
9. Use only the trucking routes, access roads, and laydown staging areas as defined by the CM.
10. Comply with daily trash removal and all recycling efforts.
11. Comply with the Owner's Tennessee Sustainable Design Guidelines and provide all necessary paperwork.
12. Perform work in accordance with the Contract Documents and adhere to TSD policies.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.

Related Work by Others:

1. Caulking around glass and glazing by WC18.
2. Roof related caulking is by WC 14.
3. Weather Barriers at Exterior Metal Stud framed walls by WC 21

Sealant Schedule:

Sealants are to be installed as listed in the schedule below. If sealants are required by the specification for a specific system that is are not listed, then the Trade Contractor installing the product shall be responsible for the associated caulking.

Item to be sealed	Responsible WC	Comments
Door Frames	24	
Plumbing fixtures	27	
Glazing Systems	18	
Masonry Systems	13	
Countertops / Millwork	20	
Metal Panel Systems	15	
Roofing Systems	14	
Top of Base	22 (Epoxy Flooring Contractor)	Where base type EPX 1 is indicated on finish schedule

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $20,000 for miscellaneous caulking, waterproofing, and sealants. Reference Work Category 00 for specific instructions on allowances.

End of Work Category No. 13C

Work Category No. 14 - Roofing & Sheet Metal

Work Included:

The subcontractor shall timely perform all Roofing & Sheet Metal work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

072200 – Roof and Deck Insulation

073113 – Asphalt Shingles

074113 – Metal Roof Panels

075323 – EPDM Roofing

076200 – Sheet Metal Flashing & Trim

077100 – Roof Specialties

077233 – Roof Hatches

079200 – Joint Sealants (As it relates to this Work Category)

108213 – Aluminum Roof Screens

Work Category Notes:

1. Furnish and install all roof shingles, membrane roofing, metal roofing, built-up roofing, roof insulation, roof expansion joints, roof hatches and accessories, gutters and downspouts, overflow scuppers, walkway protection, ballast, flashings, copings, gravel stops, reglets, termination bars, trim, sealants, ice and water shield, etc., indicated by the contract documents (not just limited to the roof plan) or as required for a complete installation, including labor, materials, equipment, adhesives, fasteners and accessories.
2. Include removal of perimeter fall protection system in conjunction with roofing installation.
3. Where perimeter details cannot be completed until the building skin is complete, provide preliminary weather protection (i.e. extend and secure membrane over parapet walls, if required).
4. Coordinate with mechanical contractor and steel contractor for installation of roof curbs for mechanical equipment and roof hatches.
5. Furnish all hoisting, lifting, and handling, etc. of materials as required for this W.C.
6. Provide broom cleaning of concrete and metal deck roof areas, just prior to installation of roofing systems, i.e. tracked dirt, unidentifiable debris.
7. All fire stopping, flashings, roof termination details shall be inspected and documented by Construction Manager prior to being covered up and concealed.
8. All specified warranty requirements shall be met by this W.C., including all costs of inspection and observation by manufacturer's representatives as required.
9. Subcontractor and manufacturer's representatives shall attend a Pre-Roofing Conference at the project site at a time determined by Owner, Architect, and the Construction Manager.

10. All materials and equipment shall be secured at all times for wind loads.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Provide and install all items noted above the roof deck in roof types 11A, 12A, and 13A on A4.02. This contractor is to provide all items noted above roof deck and below final finished roofing in all related details.*
2. *Provide all necessary hoisting, rigging, access equipment, etc. as necessary to perform the work.*
3. *Provide and install all gutters and downspouts. Downspouts to be tied into downspout boots provided and set by WC 02.*
4. *Provide and install all roof drains, overflow drains, and overflow scuppers.*
5. *Provide and install metal flashing shown underneath gutters and above soldier course of brick at all locations similar to Detail 10 on A5.50.*

Related Work by Others:

1. Prefabricated roof curbs for mechanical equipment to be furnished and installed by W.C. 27.
2. Wood blocking and wood nailers by WC 20A.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $7,500 for miscellaneous undefined flashings and metal trim. Reference Work Category 00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 14

Work Category No. 15 – Metal Wall Panels

Work Included:

The subcontractor shall timely perform all Metal Siding work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

074110 – Metal Wall Panels

074216 – Insulated Metal Wall Panels

076200 – Sheet Metal Flashing and Trim (As it relates to this work category)

Work Category 00

Work Category Notes:

1. Furnish and install all metal wall panels, rainscreen systems, and insulated metal wall panels including but not limited to bent metal trim, drip edges, copings, joint sealants, gaskets, integral louvers, secondary support framing, shims, flashings, trim, and accessories.
2. Furnish and install pre-finished sheet metal closures, end panel extrusions, copings, panel flashings, stainless steel counter flashings, etc. Furnish and install above referenced sheet metal closures and trim that is in contact with metal wall panels, insulated wall panels or rainsceens & adjacent assembly for a complete watertight assembly, including required design and engineering.
3. This contractor to coordinate and cooperate with roofing subcontractor on locations of counter flashings, sheet metal closures & trim details, anchoring and other termination details, for a complete water tight installation.
4. Full coordination with other contractors to insure all penetrations through the metal siding are sealed completely.
5. Provide a color chart with the base bid to indicate which colors have been priced. Provide an alternate price for increased costs for custom colors and color samples for these colors.
6. All embedded items, i.e. masonry and pre-cast counter flashing reglets, shall be clearly marked/labeled per approved erection drawings, and appropriately delivered to assigned subcontractor responsible for installation of embedded items. 48-hour advance notification of embedded shipments will be required for proper coordination with others.
7. Promptly construct field mock-up sheet metal.
8. Properly protect adjacent roofing systems from damage, with rigid insulation and plywood, to avoid crushing tapered roof insulation. Coordinate temporary roof protection details with roofing subcontractor.
9. All flashings, roof termination details need to be inspected by the Construction Manager prior to being covered up and concealed.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted

below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Provide and install foam insulation, secondary framing, and rainscreen system for wall types 5A, 5B, and 5C as noted on A4.01 in all conditions shown and similar to.*
2. *Provide and install prefinished metal soffit panels as noted for the Dining Hall Tower. See the unlabeled section on A4.20, 2 and 33 on A4.22, and Sheet A5.51.*
3. *Provide and Install Insulated Metal Panels system with furring channel, metal drip edge, and caulking as noted in 4 and 5 on Sheet A4.51.*

Related Work by Others:

1. Independent Field Testing by Owner.
2. Steel frame and girts by WC 12.
3. Roof expansion joints and associated counter flashing by WC-14.
4. Flat roof by WC 14.
5. Wood blocking and plywood in contact with metal wall panels by WC 20.
6. Louvers not integral with metal wall panels, blank-off panels at louvers and metal louvers by WC 27.
7. Provide in advance, counter flashing reglets to pre-cast and masonry subcontractors, installation by others.
8. Roof sump pans, roof drains, overflow roof drains, lighting protection devices and cable, wall and roof anchors, davits, roof stairs and ladders furnished and installed by others.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $5,000 for Miscellaneous Sheet Metal Trims and Flashings not defined. Reference Work Category 00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 15

Work Category No. 18 – Glass, Glazing, and Aluminum Entrances

Work Included:

Complete all Glass, Glazing, and Aluminum Entrances work in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, etc.), Addenda, Specification Sections:

079200 – Joint Sealants

084113 – Aluminum Entrances and Storefronts

084413 – Glazed Aluminum Curtain Walls

088000 – Glazing

088813 – Fire Resistive Glazing

Work Category 00

Work Category Notes:

1. Furnish and install all aluminum entrance, storefront, curtain wall system, windows, interior and exterior glass/glazing, and window systems complete as shown and/or specified. Includes all labor, material, accessories, and equipment for a complete installation.
2. Furnish and install all required fasteners, angles and supports required for complete installation of these systems.
3. Include all sealants related to this work required for a complete installation, including glass to aluminum, aluminum to aluminum, aluminum to adjacent surfaces. Verify compatibility of sealants to surfaces.
4. Furnish and install aluminum covers, sills, mullions, trim, sill extensions, flashing and counter flashing etc. where aluminum systems abut other finishes and/or are shown to incorporate structural members or adjacent to the window/glazing systems
5. Furnish and install all glazing at doors and lite frames provided by others. Includes removal, reinstallation, filler-putty and finish touch-up of glazing stops
6. Furnish and install fire stop assembly where floors adjoin the curtain wall system and insulation incorporated into the curtain wall system.
7. Coordinate rigid insulation installation with roofing, floor firestopping, and floor anchors systems.
8. Coordinate flashing details with roofing subcontractor for water tight installation. All counter flashing details to be inspected and documented by Construction Manager, prior to being concealed.
9. Expansion joints integral with curtain wall systems are by this Subcontractor.
10. Furnish and install metal panel in fills, integral with curtain wall & storefront systems.
11. Coordinate this work with structural, architectural and other related trades for thru-wall flashings, trim, closures, joint sealant work, and architectural finishes for a complete water tight assembly.
12. Complete shop drawings and sealed engineering calculations by licensed engineer showing compliance with specified design criteria.
13. Removal of all labels, stickers, markup, etc. from glass and final washing and cleaning of glass at or just

prior to substantial completion. Replace glass damaged from heat absorption into glass from stickers not removed.

14. Construct field mock-up wall requirements. Expedite mock-up shop drawings and submittals for prompt review and installation, well in advance of installation. Field mock-up will be subject to independent air & water infiltration testing, performed by an Independent Testing Agency.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Furnish and install all interior glass and glazing shown.*
2. *All Hollow Metal Frames will be provided by WC-20C, all glazing to be furnish and installed by this contractor.*
3. *Provide all hardware as specified for aluminum storefront doors. Key Cylinders will be provided by WC-20C*
4. *Provide and install the light shelves and exterior sunshades as a part of the storefront/curtainwall system.*
5. *Provide and install the slab edge fire safing at conditions where required.*
6. *Provide and install all wood blocking required for attachment of curtain wall and storefront systems.*

Related Work by Others:

1. Independent Testing Agency by Owner.
2. Finish joint sealants at aluminum covers/caps and interior surfaces by WC 24.
3. Window sills, rough carpentry, and wood and metal framing below sills by others.
4. Framed mirrors by WC 20 or 27.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $7,500. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 18

Work Category No. 20A – Millwork/ Casework

Work Included:

The trade contractor shall timely perform all work as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

064023 – Interior Architectural Woodwork

066116 – Solid Surface Fabrications

Work Category 00

Work Category Notes:

1. Complete all exterior and interior Carpentry/Millwork (with finish) as noted within this Work Category, including all labor, materials and equipment required for a complete installation.
2. All exterior and interior finish carpentry including counters, cabinets, trim, nailers, blocking (other than in wall), wood finishes complete, hardware complete and plywood sheathing. In wall blocking by others.
3. Trade contractor shall indicate on shop drawings all required in wall blocking. It is this trade contractors responsibility to review in wall blocking work as it installed and have corrections made. Assume a floor by floor review.
4. Furnish and install all out of wall blocking and any blocking not shown on drawings, but required to perform this scope of work.
5. Furnish a comprehensive mock-up as required by the contract documents. Upon approval the mock-up will remain in place.
6. All interior finish carpentry, architectural woodwork, countertops, shelving and millwork. Provide all sealants to adjacent surfaces, including dissimilar materials. Coordinate counter top support spacing with WC 27 under lavatory guards and lavatory installation.
7. Furnish and install all architectural finishes and architectural finish films (films at windows by WC 18) including all accessories, and wood trim as required.
8. Install all visual display boards (visual display boards supplied by others) including accessories and wood trim as required.
9. Furnish and install all wood millwork panels.
10. Furnish and install all fixed table tops and accessories including but not limited to; stainless steel posts, anchors, core drilling and setting materials complete. Furnish to others any embeds required for this scope of work. Inspect any installed embeds prior to proceeding with work.
11. Furnish and install all solid-surface materials and grommets as indicated.
12. All architectural hardware for cabinets supplied by this Work Category.
13. Include all stainless steel required and associated with millwork.

14. Install all custom casework including cabinets, plastic laminated coat shelves, p-lam and solid surface vanity tops, and solid surface windowsills.
15. All fabricated materials are to be shop assembled to the greatest extent possible before shipping to the job site.
16. Furnish and install sealants for all materials installed by this contractor such as cabinets, counters, sills, etc.
17. Furnish shop drawings, samples, product data, test reports, coordination drawings and other submittals as specified. Coordinate submittal schedule with the Construction Manager.
18. Clean all products at the end of the project.
19. Comply with daily trash removal and all recycling efforts.
20. Comply with the Owner's Tennessee Sustainable Design Guidelines and provide all necessary paperwork.
21. Perform all work in accordance with the Contract Documents and adhere to TSD policies.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Furnish and Install Plastic Laminate Mail Slot noted on 15/A7.50.
2. Furnish and Install Metal Locker Enclosures noted on A/7.58. Include installing lockers provided by others.
3. Furnish and Install Linoleum Coverings on Millwork Surfaces as noted.
4. Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.
5. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.

Related Work by Others:

1. Plumbing and electrical lines to this scope of work along with final hook-ups to lines by others.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $5,000. Reference WC-00 for specific instructions on allowances.

End of Work Category No. 20A

Work Category No. 20B – Doors, Frames, & Hardware

Work Included:

The trade contractor shall timely perform all work as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

081113 – Hollow Metal Doors and Frames

081416 – Flush Wood Doors

087100 – Door Hardware

Work Category 00

Work Category Notes:

1. Furnish all material outlined in the spec sections listed above for installation by others.
2. Comply with the Owner's Tennessee Sustainable Design Guidelines and provide all necessary paperwork.
3. Perform all work in accordance with the Contract Documents and adhere to TSD policies.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.
2. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.
3. Make sure delivery drivers are provided a copy of the Site Access Plan showing the route to the jobsite to be used.
4. For Alternate listed on Bid Form, Provide and Install Auto Operators and all associated hardware. Electrical to provide 110V Power only. This trade to furnish all devices, low voltage wiring, power supplies, etc.

Related Work by Others:

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $5,000 for miscellaneous hardware. Reference WC-00 for specific instructions on allowances.

End of Work Category No. 20C

Work Category No. 20C – Overhead Doors

Work Included:

The subcontractor shall timely perform all Coiling Overhead Doors and Overhead Coiling Smoke Curtains as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

083323 – Coiling Overhead Doors

083493 – Coiling Overhead Smoke Curtain

111319 – Loading Dock Equipment

Work Category 00

Work Category Notes:

1. Furnish and install Coiling Overhead Doors and Overhead Coiling Smoke Curtains. Includes all labor, material, accessories, and equipment for a complete installation.
2. Include support not shown, but required, for this work.
3. Provide coordination drawings for work by other trades showing location of backing, supports, electrical connections, etc.
4. Daily clean up and legally dispose of all construction debris related to this Work Category.
5. All deliveries F.O.B. job site, freight cost included.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Furnish and install coiling overhead doors and overhead coiling smoke curtains per specifications.*
2. *Furnish and Install any necessary support, including but not limited to steel angles, wood blocking, bracing, mounting plates, etc.*
3. *Furnish and install loading dock equipment per specifications for the Dining Hall.*
4. *Furnish embed plates and angles for perimeter of leveler pit and face of levler for installation by WC-10*
5. *Provide shop drawings and submittal information within 10 business days of the award of this subcontract in order for requirements to be coordinated with other trades.*
6. *Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.*
7. *All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.*

Related Work by Others:

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 20C

Work Category No. 20D – Laboratory Casework & Fume Hoods

Work Included:

The trade contractor shall timely perform all work as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

115313 – Laboratory Fume Hoods

123553 – Laboratory Casework

Work Category 00

Work Category Notes:

1. Furnish and Install all Laboratory Fume Hoods and Laboratory Casework as noted within this Work Category, including all labor, materials and equipment required for a complete installation.
2. Trade contractor shall indicate on shop drawings all required in wall blocking. It is this trade contractor's responsibility to review in wall blocking work as it installed and have corrections made. Assume a floor by floor review.
3. Furnish and install all out of wall blocking and any blocking not shown on drawings, but required to perform this scope of work.
4. Furnish a comprehensive mock-up as required by the contract documents. Upon approval the mock-up will remain in place.
5. Furnish and install all solid-surface materials and grommets as indicated.
6. All architectural hardware for cabinets supplied by this Work Category.
7. Include all stainless steel required and associated with millwork.
8. All fabricated materials are to be shop assembled to the greatest extent possible before shipping to the job site.
9. Furnish and install sealants for all materials installed by this contractor such as cabinets, counters, sills, etc.
10. Furnish shop drawings, samples, product data, test reports, coordination drawings and other submittals as specified. Coordinate submittal schedule with the Construction Manager.
11. Clean all products at the end of the project.
12. Comply with daily trash removal and all recycling efforts.
13. Comply with the Owner's Tennessee Sustainable Design Guidelines and provide all necessary paperwork.
14. Perform all work in accordance with the Contract Documents and adhere to TSD policies.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Furnish and Install ALL Laboratory Casework, Counter Tops, Fume Hoods, and Lab Storage Casework in the Biology/Chemistry and Physics/Science Suites.
2. Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.
3. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc., shall be confirmed with the HPBr specifications and checklist.
4. Include all fume hood alarms and controls.
5. Include calibration and testing.
6.

Related Work by Others:

1. Teacher's desks to be furnished and installed by WC-20A.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

End of Work Category No. 20D

Work Category No. 20E – Glue Lam Beams

Work Included:

The trade contractor shall timely perform all work as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

061813 – Glue Lam Beams

Work Category 00

Work Category Notes:

1. Complete all Glue Lam Beams work as noted within this Work Category, including all labor, materials and equipment required for a complete installation.
2. Furnish and install all architectural finishes on beams as indicated in the documents.
3. Furnish shop drawings, samples, product data, test reports, coordination drawings and other submittals as specified. Coordinate submittal schedule with the Construction Manager.
4. Comply with daily trash removal and all recycling efforts.
5. Comply with the Owner's Tennessee Sustainable Design Guidelines and provide all necessary paperwork.
6. Perform all work in accordance with the Contract Documents and adhere to TSD policies.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Furnish and install glue lam beams per detail 12 on A4.53. Include all steel connection plates, HSS column to hang the beam and the circular steel plate in the center of the beams. Inlcude wrapping the HSS column in wood.
2. Submit engineered shop drawings bearing the stamp of Professional Engineer registered in the State of Tennessee.
3. Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.
4. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.

Related Work by Others:

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

End of Work Category No. 20E

Work Category No. 21 – Stucco/Framing/Drywall/Insulation

Work Included:

The subcontractor shall timely perform all Stucco/Framing/Drywall/Insulation work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

Work Category No. 00 – General Requirements for All Subcontractors
05 40 00 – Cold-Formed Metal Framing
05 44 00 – Cold-Formed Metal Trusses
06 16 00 – Sheathing
07 21 00 – Thermal Insulation
07 25 00 – Weather Barriers
07 84 56 – Fire Safing
09 22 00 – Portland Cement Stucco
09 22 16 – Non-Structural Metal Framing
09 29 00 – Gypsum Board

Work Category Notes:

1. Furnish and install all interior and exterior gypsum board, metal stud framing, cold-formed framing, and insulation, as shown and/or specified. Includes all labor, material, accessories, and equipment for a complete installation.
2. Above ceiling support wires for soffits and hard ceilings will be installed after MEP-above ceiling rough-ins. Hanger wires where required to support light fixtures, grilles, and registers, etc.
3. Furnish and install all expansion joints and covers in drywall and soffit assemblies. Properly anchor, level and set, including fire barrier(s) under and beyond expansion joint areas. Installation of wall and ceiling expansion joints shall occur just prior to finish painting per floor. Fire barrier(s) within concealed locations shall be installed and inspected prior to being covered by architectural walls and ceilings.
4. All interior and exterior wall and ceiling fire stopping, thermal and acoustical insulation as it relates to this contractors work is included. Firestopping of MEP/FP through-wall penetrations will be performed by each individual MEP/FP trade contractor and not by this WC21 trade contractor.
5. Furnish and install all fireproofing and per the drawings and specifications.
6. Acoustic sealants and caulking of work within this work category including bottom, sides and top of rated walls. Furnish and install all necessary fire caulking related to this W.C. including all required fire taping of walls and ceilings. Subcontractor shall be required to fire stop, smoke seal and sound seal, all other remaining penetrations and bottom and top of wall conditions, and schedule all Work of this type to completed and inspected just prior to ceiling grid installation.
7. Properly fire stop and seal all fire wall penetrations created by this work. Fire stop to mechanical, electrical, and plumbing sleeves furnished and installed by others.
8. Furnish and install all access panels shown on the drawings in stud partitions or ceilings including

mechanical and electrical panels. It is the responsibility of this subcontractor to review all drawings complete including the mechanical and electrical drawings. Install all access panels in metal stud walls and ceilings furnished by mechanical, fire protection, and electrical contractors (not shown on drawings).

9. All layout and control lines for wall, partitions, and ceilings related to this W.C.
10. Install shimming necessary to maintain true lines.
11. Furnish and install all gypsum board ceiling surfaces per the drawings and specifications. Include cutting sprinkler heads. A nominal quantity of additional heads required by inspectors shall be anticipated in addition to those shown on the fire protection drawings.
12. Install all light gauge metal framing including truss system & stiff clips.
13. Tape and sand joints to bottom of gypsum board to provide even, clean joints to receive vinyl base.
14. All cold-formed framing, fire safing, fire-stopping, vapor barriers, thermal insulation, non-load bearing steel framing, gypsum board, glass-reinforced gypsum fabrications, including all labor, materials and equipment required for a complete installation.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.
2. All Section 07 25 00 Weather Barrier work shall be installed by this Work Category.
3. All Section 09 22 00 Portland Cement Stucco shall by installed by this Work Category.
4. Installation of all hollow metal door and window frames within framed walls. Frames shall be provided by others. Frames in CMU masonry walls shall be installed by others.
5. Pre-engineered, light gauge metal roof trusses for the High School roof, Part A area, are included. Sealed drawings and calculations by a professional engineer licensed in the State of Tennessee are required.
6. Furnish and install 12-gauge continuous bent plates along metal truss valleys; tie-ins to parapet walls (see Detail 14, Sheet S4.02, typical); at truss/rafter tails (see Detail 13, Sheet S4.03, typical); and at ridges as shown.
7. All metal blocking at metal roof trusses (see Detail 14, Sheet S4.02, typical).
8. All foam insulation inserts at metal decking (see Detail 5, Sheet A5.50a, typical).
9. Labeling of all rated gypsum board walls in accordance with Section 07 84 13 – Penetration Firestopping.
10. Gypsum ceiling trim components as indicated in Detail 1, Sheet A6.50.
11. Metal stud framing for tongue and groove wood ceilings, including one layer of ¾" FRT plywood substrate.
12. 5/8" gypsum board on 7/8" hat channels attached to bottom of trusses, as noted on Reflected Ceiling Plans.
13. The general sequence of work for interior drywall partitions is as follows:

i. Layout walls and install top track and seal chalk lines on floor.

ii. Allow ductwork and large piping installation.

iii. Install door frames and frame walls.

iv. Prior to hanging gypsum board, the CM will inspect each door frame for level and plumb and sign-off. No board is to be hung without sign-off.

v. Hang and finish gypsum board as directed by the CM. No walls can be closed until the CM has confirmed that all inspections have been passed.

14. Floor tracks to be set and anchored in sealant bed as indicated in Interior Partition Types.
15. For all walls that extend to the deck above, use DensArmour or waterproof/mold proof shaft board above ceiling height to allow early installation prior to the majority of MEP/FP rough-in, and prior to the building being 100% dried-in.
16. Early hanging and finishing of electrical/security rooms and all shaft walls with DensArmour or waterproof/mold proof shaft board will be required.
17. All toilet rooms shall receive waterproof/mold proof gypsum board as specified in Section 09 29 00.
18. Provide and install cement backer board at walls to receive ceramic tile. Backer board is to be installed and finished such that the wall plane above and below the height of the ceramic tile is in line and smooth.
19. All cavity walls shall be vacuum cleaned by this trade contractor immediately prior to the closing of the wall.

Related Work by Others:

1. Dumpsters by Construction Manager.
2. Temporary water and electrical by Construction Manager.
3. Benchmarks and column lines (one in each direction) by Construction Manager.
4. Roof insulation by WC-14
5. Nailable roof insulation system, including roof sheathing by WC-14.
6. Concealed extruded foam insulation board by WC-11.
7. Wood blocking by WC-20A.
8. Metal roof decking, bar joists, and structural steel by WC-12.
9. Rigid insulation shall be installed by WC-11.
10. Damproofing shall be installed by WC-13.
11. Acoustical ceilings shall be by WC-21E.
12. Independent testing and inspections by Construction Manager.
13. Temporary heat by WC-27.
14. Exclude foundation and masonry insulation.

Allowances:

This Trade Contractor shall include in their Base Bid a Construction Manager's allowance of **$50,000**. This allowance is in addition to the base scope of work and shall be in addition to the daily clean-up requirements for this Work Category. This allowance shall be utilized or credited specifically as directed by the Construction Manager.

End of Work Category No. 21

Work Category No. 21E – Acoustical Ceilings

Work Included:

The subcontractor shall timely perform all Acoustical Ceilings work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

Work Category No. 00 – General Requirements for All Subcontractors
09 51 13 – Acoustical Panel Ceilings

Work Category Notes:

1. Furnish and install all acoustical panel ceiling systems as shown and/or specified. Includes all labor, material, accessories, and equipment for a complete installation.
2. Above ceiling support wires for ceiling grid, soffits and hard ceilings will be installed after MEP-above ceiling rough-ins. Hanger wires where required to support light fixtures, grilles, and registers, etc.
3. Furnish and install all expansion joints and covers in ceiling grid assemblies. Properly anchor, level and set, including fire barrier(s) under and beyond expansion joint areas. Fire barrier(s) within concealed locations shall be installed and inspected prior to being covered by architectural walls and ceilings.
4. All layout and control lines for ceilings related to this W.C.
5. Furnish and install all acoustical panel ceiling surfaces per the drawings and specifications. Include cutting sprinkler heads. A nominal quantity of additional heads required by inspectors to be expected in addition to those shown on the fire protection drawings.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.
2. All ceiling types ACT-1, ACT-2, ACT-3, ACT-4, and ACT-5.
3. Suspended ceiling clouds shall be laterally braced to prevent any and all lateral movement and sway. This is a special requirement of the Tennessee School for the Deaf.
4. Ceiling shall be sloped, as indicated, and include "shadow gap wall angle" trim pieces as indicated (reference Detail 10, Sheet A6.50, typical).
5. Steel rod hangers and braces for suspended ACT ceiling types. Painting of hanger rods and braces is included by this trade contractor.

Related Work by Others:

1. Dumpsters by Construction Manager.
2. Temporary Water and electrical by Construction Manager.
3. Benchmarks and column lines (one in each direction) by Construction Manager.
4. Gypsum board ceilings by WC-21.
5. 5/4" T&G Wood ceilings by WC-20A.
6. Independent testing and inspections by Owner.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 21E

Work Category No. 22A– Resinous Flooring

Work Included:

The trade contractor shall timely perform all Resinous Flooring work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

096723 – Resinous Flooring

079200 – Joint Sealants (As it relates to this Work Category)

Work Category Notes:

1. Furnish and install all resinous flooring including sealants, integral coved base, and accessories as required for a complete installation.
2. Furnish and install all transition, thresholds and reducer strips between this floor system and different floor types.
3. Provide additional temporary lighting as required for proper installation.
4. Furnish and install any necessary waterproof membrane required for this scope of work.
5. Install and maintain protection of flooring (cardboard or equal) until substantial completion. Remove and final clean after substantial completion.
6. Trade contractor is responsible for repairs for damage to wall finishes and other adjacent surfaces caused by this installation.
7. This trade contractor accepts condition of floor …..(Flatness, moisture, finish, adhesion compatibility, etc.). Conduct all moisture content testing before installing any flooring per specifications.
8. Concrete floors have been placed to meet the flatness tolerances listed in concrete specifications. The contractor accepts the condition of the floor (flatness, moisture, finish, adhesion compatibility, etc.) The trade contractor shall read and understand the requirements called out in the concrete specification. Trade contractor shall provide all surface prep, including scraping, sanding, filling, feathering, etc. for a complete installation.
9. Verify curing compounds & sealers called out in the concrete specification are compatible for this flooring system.
10. Comply with the daily trash removal and all recycling efforts.
11. Comply with the Owner's Tennessee Sustainable Design Guidelines and provide all necessary paperwork.
12. Perform all work within the Contract Documents and adhere to the University's policies.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Submittals will be uploaded using the project website designated for this project. Submittals will need to

be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.

2. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.

End of Work Category No. 22A

Work Category No. 22B – Resinous Matrix Terrazzo Flooring

Work Included:

The subcontractor shall timely perform all Terrazzo work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

096623 – Resinous Matrix Terrazzo Flooring

079200 – Joint Sealant (As it relates to this Work Category)

Work Category Notes:

1. Furnish and install all terrazzo flooring, as required (at floors, walls, sills, base, etc) including floor patching, preparation, joints, and sealing as shown and/or specified. Includes all labor, material, accessories, and equipment for a complete installation.
2. Furnish and install all transition strips between different floor types.
3. Provide additional temporary lighting as required for proper installation.
4. Furnish and install materials necessary to match finishes in existing tie-in areas and at different floor types.
5. Protection of flooring shall be provided by this contractor until substantial completion. Provide final cleaning after floor protection is removed.
6. Coordinate elevations of floor sinks and drains with WC 27 for proper adjustment prior to installation of flooring, providing acceptable slope, patterns, and transitions.
7. Concrete floors have been placed to meet the flatness tolerances listed in WC 10 specifications. Subcontractor shall provide all surface prep, including scraping, sanding, filling, feathering, etc. for a complete installation.
8. Broom sweep and prep floor as required for this work.
9. Verify curing compounds & sealers used on new and existing surfaces are compatible for flooring adhesives and materials.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Provide and Install Terrazzo Flooring System for the monumental stair shown on 5/A7.01 and subsequent details on A7.10.*
2. *Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.*
3. *All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.*

Related Work by Others:

1. Resilient base by WC 23.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 22B

Work Category No. 23 – Tiling, Carpet and Resilient Flooring

Work Included:

The subcontractor shall timely perform all Hard Tiling, Carpet and Resilient Flooring work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

093000 – Tiling

096500 – Resilient Flooring and Accessories

096813 – Carpeting

Work Category 00

Work Category Notes:

1. Furnish and install all hard tiling, carpet, resilient tile and sheet flooring, hardwood flooring, as required for a complete installation, including resilient and carpet wall base, stair nosings, treads, or risers, adhesives, seam welding, seam sealing, floor patching, skim coating, floor leveling, feathering, final cleaning and/or vacuuming.
2. Furnish and install all transition and reducer strips between different floor types.
3. Furnish and install all resilient stair treads, risers, nosings, etc. as required.
4. Provide additional temporary lighting as required for proper installation.
5. Furnish and install materials necessary to match finishes in existing tie-in areas and at different floor types.
6. Install and maintain protection of flooring until substantial completion. Remove and final clean after substantial completion.
7. Responsible for repairs for damage to wall finishes and other adjacent surfaces caused by carpet installation.
8. This contractor accepts condition of floor …..(flatness, moisture, finish, adhesion compatibility, etc)
9. Concrete floors have been placed to meet the flatness tolerances listed in WC 10. Subcontractor shall provide all surface prep, including scraping, sanding, filling, feathering, etc. for a complete installation.
10. Verify curing compounds & sealers used on new and existing surfaces are compatible for flooring adhesives and materials.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Provide any floor prep as necessary if requirements of the products being used for flatness and levelness of concrete floor exceeds that of the specified tolerance listed in Section 033000 3.8D .*
2. *Provide and Install Flooring in Elevator as noted.*
3. *Subcontractor is to review the curing compound being used and verify specified warranties shall be honored.*

4. *Furnish and install all hard tiling as specified. Include any joint sealants at transitions from tile to other materials or integral to the tiling as required. Include waterproofing as specified in section 09 30 00.3.3*
5. *Include broom cleaning all substrates prior to installation.*
6. *Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.*
7. *All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.*

Related Work by Others:

1. Concrete substrate has been installed in accordance with 033000 for flatness and levelness by WC 10.
2. Note any transition strips that may logically be furnished and installed by other flooring contractors, depending on materials and/or sequencing of installations.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 23

Work Category No. 24 – Painting

Work Included:

The subcontractor shall timely perform all Painting work as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

1. Furnish all labor and material to complete all interior and exterior painting and wall coverings as shown and/or specified, including but not limited to; exposed masonry, exposed steel, exposed unfinished wood materials, field painting of equipment, bollards, stairs, handrails, ladders, decorative columns, concrete walls, lintels, door frames, louvers, canopies, handrails, bollards, trellis, mechanical, electrical and fire protection piping (including protection of sprinkler heads) etc. including all labor, materials and equipment required for a complete installation.
2. Steel stairs and handrails will be used for the duration of the project. Subcontractor to clean, sand, prep, and touch-up all metal stair components to receive finish paint. Finish paint will be scheduled at the completion of project, or as directed by Construction Manager.
3. All required surface prep for this work including touch up of steel primer as required.
4. Final wall preparation to include minor patching (scratches and small dents) and minor caulking in all areas which call out for paint. All areas should be reviewed by the painter prior to new finishes being applied.
5. Finishing of millwork/casework and trim items not furnished pre-finished, including wood filler, and putty if required. Light sanding may be necessary prior to applying finishes.
6. Temporary protection of all areas and clean up of paint overspray (if materials are outside of interior renovations) and drippings. Protect all new and existing finishes adjacent to painted areas prior to painting.
7. Protect fire suppression heads; promptly remove protection.
8. Sequence the work as follows: patching and priming, first finish coat, installation of cabinets, tops, etc, and then final coat. Multiple mobilizations will be required by this work category due to phasing of construction.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Furnish and install stain for all tongue and groove wood ceilings installed by WC-20A.*
2. *Seal all concrete floors noted as CONC 1 on the finish schedule on A9.01.*
3. All interior joint sealants at the following conditions:
   a. Hollow metal door & window frame-to-gypsum board
   b. Gyp. Board-to-curtain wall aluminum framing

   Note: Joint sealants at millwork and solid surface window sills, by others (WC-20B). Joint sealants at ceramic tile, by others (WC-23).
4. *Submittals will be uploaded using the project website designated for this project. Submittals will need to be*

accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.

5. *All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.*

Related Work by Others:

1. Caulking of plumbing fixtures by WC 27, millwork and cabinets by WC 20B exterior aluminum glazing by WC 18.
2. Labeling of piping system and fire rated partitions by others.
3. Traffic Marking by W.C. 06.
4. Caulking of masonry joints by WC 13.
5. Wood Doors are Factory Finished by WC-20C.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 24

Work Category No. 25C - Window Shades

Work Included:

The trade contractor shall timely perform all Window Shade work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

122413 - Window Treatments

Work Category 00

Work Category Notes:

1. Furnish and Install all window shades, electric motors, and controls with the scope of work.
2. Include support not shown, but required, for this work.
3. Provide coordination drawings for work by other trades showing location of backing, wood blocking, supports, electrical connections, etc.
4. Coordinate all controls and electrical work with electrical contractor to perform this scope of work.
5. Coordinate installation schedule after final finishes have been applied.
6. Submit a comprehensive submittal within 120 days of receiving award of subcontract.
7. Provide any mock-ups at the request of the CM and or owner.
8. Provide any necessary training for operation to the owner after completion.
9. Comply with Owner's Tennessee Sustainable Design Guidelines (TSDG) and provide all necessary paperwork.
10. Comply with the daily trash removal and all recycling efforts.
11. Perform all work with the Contract Documents and adhere to the University's policies.
12. All deliveries F.O.B. job site, freight cost included.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.
2. All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc., shall be confirmed with the HPBr specifications and checklist.
3. Provide tracks for all blackout shades.

Related Work by Others:

2. Electrical by WC 28.

End of Work Category No. 25C

Work Category No. 25H – Operable Partitions

Work Included:

The subcontractor shall timely perform all Operable Partition work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

102226 – Operable Partitions

Work Category 00

Work Category Notes:

1. Furnish and install Operable Partitions. Includes all labor, material, accessories, and equipment for a complete installation.
2. Include support not shown, but required, for this work.
3. Provide coordination drawings for work by other trades showing location of backing, supports, electrical connections, etc.
4. Daily clean up and legally dispose of all construction debris related to this Work Category.
5. All deliveries F.O.B. job site, freight cost included.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. *Furnish and install coiling overhead doors and overhead coiling smoke curtains per specifications.*
2. *Furnish and Install any necessary support, including but not limited to steel angles, wood blocking, bracing, mounting plates, etc.*
3. *Provide shop drawings and submittal information within 10 business days of the award of this subcontract in order for requirements to be coordinated with other trades.*
4. *Submittals will be uploaded using the project website designated for this project. Submittals will need to be accompanied be all necessary paperwork including the material compliance form and any paperwork called out in the specifications by trade.*
5. *All materials shall be in accordance with the High Performance Building Requirements (HPBr), or sustainable design requirements. Material requirements for recycled content, regionally supplied materials, low VOC requirements, etc, shall be confirmed with the HPBr specifications and checklist.*

Related Work by Others:

1. 120V Electrical for Operable Partitions by W.C. 28. Any low Voltage controls by this contractor (WC-25G).

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference WC-00 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 25H

Work Category No. 26 - Fire Protection

Work Included:

The subcontractor shall timely perform all Fire Protection work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Contract Forms and General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

07 84 13 Penetration Firestopping – (As it relates to this scope of work)

08 31 00 Access Doors

21 05 00 Fire Protection and Sprinkler

Work Category No. 00

Work Category Notes:

1. All design, fabrication, and installation of all wet and dry fire protection systems. Include all pumps, stand pipe risers, hose cabinets, hoses and associated trim, tamper switches, flow switches, gauges, alarms, test headers, and fire department connections as specified and detailed in the documents or as required for a complete installation, including labor, materials, accessories, and equipment for a complete installation.
2. All permits, fees, inspections and approvals required by governing jurisdictions. This will include liaison between state and local agencies and insurance carriers to ensure code compliance and for securing approval for the facility.
3. All demolition, cutting, coring, patching, sleeving and firesafing of walls, floors, ceilings, etc., required for the installation of this work. Patch and repair work is to be done professionally by skilled craftsmen. Include all fire wall penetrations required for this work and sealing of same. All such openings require prior approval from the Construction Manager before work begins.
4. All Utility connections, disconnections, tie-ins crossovers, shut downs and similar work must be performed and scheduled so they will not interfere with other work. It may be necessary to make these changes during "off" hours, or it may be necessary to make "hot tap" connections. The contractor should plan on premium time for this work. Coordinate with the Construction Manager prior to performing this work.
5. Furnish any access panels required for walls and ceiling valves and controls that are not shown on the Architectural/Mechanical/Fire Protection plans but are necessary for the Fire Protection System. Installation will be others.
6. Furnish all hoisting, lifting, scaffolding and handling of all materials required to complete this W.C.
7. This contractor shall produce shop drawings as required by code and show all heads on the Architectural Drawings for approval, prior to installation of the heads. .
8. Extreme care is to be taken when installing hangers and equipment in the area that has "spray on fireproofing", so as not to damage it. This contractor will be responsible for patching fireproofing in case of damage by this trade. This work to be performed by a qualified installer so that the warranty will not

be affected.

9. Provide and install pipe identification and other required identification related to this W.C.

10. The Electrical, Fire Protection, and Mechanical Contractors will be required to coordinate in BIM through a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 0131 13.23. Your attendance will be required for these meetings. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination.

11. Subcontractor shall protect existing structures, equipment and finishes from damage during the performance of this Work. The items listed below represent a few special requirements to promote a respectful and professional working environment, and are not to be considered all inclusive:

    - Gang boxes will not be allowed within spaces that have finish flooring and finish painted walls.
    - Pipe thread/cutting machines will have floor protection, preventing oil droppings/spillage onto concrete and finish floors.
    - Testing and draining fire protection systems shall be done in a neat and clean fashion, to avoid effluent spraying on finish surfaces.
    - After each floor has completed rough-in installation, the balance of materials will be removed from each floor. Materials for drops and heads will be delivered, stored on movable rubber wheeled carts and promptly installed.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this work category:

1. *Fire line will be stubbed up inside the building 2' AFF as shown by WC 02. This contractor shall coordinate WC 2 for the specific riser location and details.*

Related Work by Others:

1. All site fire lines, hydrants, PIV's, etc., including all components listed on in the Civil Details for the site fire line and assemblies by W.C. 02.
2. Kitchen Hood with Fire Suppression System by W.C. 27.
3. Painting of exposed fire protection by W.C. 24.
4. Electrical, Fire Alarm, and Detection System including wiring of tamper and flow switches by W.C. 28. Connection of fire pump controller to building fire alarm system by WC-28. However, Subcontractor to provide approved installation wiring diagrams/instructions, coordination, factory support etc. to allow for proper installation
5. Installation of access panels by W.C. 21.
6. Fire extinguishers and fire extinguisher cabinets by W.C. 20.
7. Housekeeping pads if shown by WC 10.

8. Installation of electrical devices furnished with pumps and controllers, but not specified to be factory mounted, by WC-28 (electrical)

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 26

Work Category No. 27 – Mechanical and Plumbing Systems

Work Included:

The subcontractor shall timely perform all Mechanical and Plumbing work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Contract Forms and General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

07 84 13 Penetration Firestopping – (As it relates to this scope of work)

08 31 00 Access Doors

Division 22 Plumbing - Complete

Division 23 HVAC - Complete

Work Category No. 00

Work Category Notes:

1. Furnish and install all mechanical and plumbing systems, including domestic water, sanitary and vent, gas piping, vacuum piping, compressed air, water for injection systems, hydronic piping, refrigerant piping, water heaters, boilers, unit heaters, unit ventilators, air handling units, chillers, cooling towers, VAV boxes, mechanical louvers, radiant heat systems, humidifiers, condensate, heat exchangers, ductwork, insulation, plumbing fixtures, toilet accessories, trench drains, temperature controls including DDC or BMS systems, system commissioning, air and water balancing, etc., indicated by the contract documents (not just limited to the mechanical and plumbing drawings) or as required for a complete installation, including labor, materials, accessories and equipment for a complete installation.
2. Investigate areas prior to demolition activities, reroute and relocate existing services required for occupied operation. Cut, cap, and make safe, all existing plumbing, medical gases, temperature controls and HVAC systems in renovated areas prior to demolition. Properly identify and mark system and components to be removed.
3. All cutting, capping, coring, patching and firesafing of walls, floors, ceilings, etc., required for the installation of this work. Patch and repair work is to be done professionally by skilled craftsmen. All such openings require prior written approval from the Construction Manager, before work begins. Furnish and install all sleeves and or misc. steel in walls, floors, roofs and ceilings that may be required by this W.C.
4. Furnish drawings showing size and location of concrete pads required for mechanical equipment to Construction Manager. Installation of these pads is by W.C. 10.
5. All utility connection, disconnections, tie-ins, crossovers, shut downs and similar work must be performed and scheduled so they will not interfere with other work. It may be necessary to make these changes during "off" hours, or it may be necessary to make "hot tap" connections. The contractor should plan on premium time for this work. Coordinate with the Construction Manager prior to performing this work.
6. Furnish access panels where required for the wall and ceiling valves, dampers and controls that are not shown on the Architectural/Mechanical plans but are necessary for the Mechanical Systems.

7. Extreme care is to be taken when installing hangers and equipment in the area that has "spray on fireproofing", so as not to damage it. This contractor will be responsible for patching fireproofing in case of damage by this trade. This work is to be performed by a qualified contractor so that the warranty will not be affected.

8. Furnish all hoisting, lifting, scaffolding and handling of all materials required to complete this work category.

9. The Electrical, Fire Protection, and Mechanical Contractors will be required to coordinate in BIM through a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 013113.23. Your attendance will be required for these meetings. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination.

10. Provide and install mechanical equipment tags, pipe identification and other required identification of signage related to his work.

11. Run the various building piping systems out five (5) feet from the building walls and make the final connections to underground systems.

12. The mechanical contractor will provide assistance during concrete pours to guarantee the proper elevation of drains is maintained during the concrete pour. Accommodate floor finishes when calculating elevations.

13. Furnish and install all roof curbs and necessary or required auxiliary steel framing for equipment supplied under this W.C. This includes any auxiliary steel required at roof openings not shown on the structural drawings, or for pipe hangers and plenum stiffeners.

14. A coordination meeting will be set up between the controls contractor, mechanical contractor, electrician, and construction manager prior to control work. This will include all required work for a complete system as indicated in the construction documents.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this work category:

1. *This Contractor shall cut, cap, and make safe, all existing plumbing, gases, temperature controls and HVAC systems in planned areas to demolish. (Poore Hall and Existing Dining Hall)*

2. *The Contractor shall provide all excavation and backfill required for this scope of work including suitable backfill, compaction, and restoration of grade. All spoils generated by this scope of work shall stock piled in areas onsite to be determined by the Construction Manager.*

3. *Site gas piping, meter and regulator to be provided by this contractor, including AID to construction cost. Gas piping and accessories beyond the meter to be provide complete, by this work category.*

4. *This contactors shall include all permits and fees required for utility origination and AID to construction cost.*

5. *This Contractor shall provide and install air compressor, air piping and accessories.*

6. *At the Dining Hall, (Sheet P5.10) this contractor to provide all Grease Waste Line (GW) and Sanitary Sewer Line (SA) up to and including the Wye downstream of the Grease Interceptor. This includes the Grease Interceptor, risers, and manhole covers.*

7. *This contractor shall include weekly and monthly service as called out for the Chemical Treatment of Closed Circuit Cooler Spray Water System.*
8. *This Contractor shall provide and install the complete Kitchen Hood including but not limited to the range hood, ventilator system, and fire suppression system.*
9. *This contractor shall provide and install all louvers.*
10. *Provide and install a complete Dust Collection System including but not limited to: Drums for dust collection, ductwork, spark detectors, controls, and valving.*
11. *Install vent kit provided by others for the Kilns. Ductwork, wall penetrations and connection is by this contractor.*
12. *This contractor shall connection all required utilities to the kitchen equipment. Electrical connection is by W.C. 28. Kitchen equipment is furnished and installed by the owner.*
13. *This trade is responsible for coordinating all applicable commissioning requirements per Spec Section 013391.*
14. *For the Alternate Geothermal System, this trade is to include the header and valves inside the building. Driller will run pipes to header. This trade connects to header.*

Related Work by Others:

1. Concrete equipment pads by W.C. 10.
2. Building foundation drain by W.C. 10
3. Roof vents flashing and counter flashing by W.C. 14.
4. Fire protection system and risers by W.C. 26.
5. Site and footing drainage systems by W.C. 02B.
6. Power supply to mechanical equipment by W.C. 28.
7. Installation of access panels/doors by W.C. 21.
8. Site utilities beyond 5' from building perimeter by WC 02A or Utility Company.
9. Counter tops to be cut by WC 20.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $10,000 for temporary utility usage. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 27

Work Category No. 28 – Electrical Systems

Work Included:

The subcontractor shall timely perform all Electrical work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Contract Forms and General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

07 84 13 Penetration Firestopping – (As it relates to your scope of work)

08 31 00 Access Doors

Division 26 Electrical – Complete

Division 27 Communications – Rough In / Raceways unless noted otherwise

Division 28 Electronic Safety and Security – Rough In / Raceways unless noted otherwise

28 31 00 Fire Alarm System - Complete

Work Category No. 00

Work Category Notes:

1. Furnish and install all electrical systems, including power, lighting, site lighting, fire alarm, public address system, lightning protection system, clocks and clock system, telephone/data and CATV system raceways, system commissioning, etc., indicated by the contract documents (not just limited to the electrical drawings) or as required for a complete installation, including labor, materials, equipment, adhesives, fasteners, supports, hangers, grounds, blocking, shims and all necessary anchoring devices and accessories.
2. Investigate areas prior to demolition activities, reroute and relocate existing services required for occupied operation. Cut, cap, and make safe, all existing electrical systems in renovated areas prior to demolition. Properly identify and mark system and components to be removed by others.
3. All cutting, capping, coring, patching and firesafing of walls, floors, ceilings, etc., required for the installation of this work. Patch and repair work is to be done professionally by skilled craftsmen. All such openings require prior written approval from the Construction Manager, before work begins. Furnish and install all sleeves and or misc. steel in walls, floors, roofs and ceilings that may be required by this W.C.
4. Furnish drawings showing size and location of concrete pads indicated on the drawings for electrical equipment to the Construction Manager. Installation of these pads is by W.C. 10. All excavation, backfill and compaction related to this W.C. Suitable backfill will be required by this trade and this contractor will be responsible for removal (from site) of all unsatisfactory fill in accordance with the documents.
5. All utility connection, disconnections, tie-ins, crossovers, shut downs and similar work must be performed and scheduled so they will not interfere with other work. It may be necessary to make these changes during "off" hours, or it may be necessary to make "hot tap" connections. The contractor should plan on premium time for this work. Coordinate with the Construction Manager prior to performing this work.
6. Furnish access panels where required for the wall and ceiling valves, dampers and controls that are not

shown on the Architectural/Electrical plans but are necessary for the Electrical Systems.

7. Extreme care is to be taken when installing hangers and equipment in the area that has "spray on fireproofing", so as not to damage it. This contractor will be responsible for patching fireproofing incase of damage by this trade. This work is to be performed by a qualified contractor so that the warranty will not be affected.

8. Furnish all hoisting, lifting, scaffolding and handling of all materials required to complete this work category.

9. The Electrical, Fire Protection, and Mechanical Contractors will be required to coordinate in BIM through a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 0131 13.23. Your attendance will be required for these meetings. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination.

10. Provide and install panel labeling, identification and other required identification of signage related to his work.

11. The electrical contractor will provide assistance during concrete pours to guarantee the proper elevation of in-floor items (outlets, activation kits (if applicable), etc) are maintained during the concrete pour. Accommodate floor finishes when calculating elevations.

12. A coordination meeting will be set up between the controls contractor, mechanical contractor, electrical contractor, and construction manager prior to control work. This will include all required work for a complete system as indicated in the construction documents.

13. Electrical connections to equipment and devices provided by others, including by not limited to duct detectors, fire dampers, flow and tamper switches, variable frequency drives, power assist door motors, food service equipment, overhead doors, coiling shutters, projection screens, Owner furnished items, etc. Verify construction documents have been coordinated with power requirements of equipment prior to installation of devices.

14. Install electrical disconnects for all mechanical equipment provided by W.C. 27.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this work category:

1. *This Contractor shall cut, cap, and make safe, all existing electrical systems in planned areas to demolished. (Poore Hall and Existing Dining Hall)*

2. *The Contractor shall provide all excavation and backfill required for this scope of work including suitable backfill, compaction, and restoration of grade. All spoils generated by this scope of work shall stock piled in areas onsite to be determined by the Construction Manager.*

3. *This contractor shall provide, install, and maintain temporary power drops for construction. See allowance below for temporary power consumption cost.*

4. *This contractor shall provide, install and maintain temporary lighting as required. Task lighting is provided by each individual trade contractor.*

5. *Provide and install Concrete Light Pole Bases and Ductbank as required.*

6. *Provide and install all raceways for communications, intercom/digital telephone system, and data/voice systems, and CCTV system.*
7. *Provide and install a complete Fire Alarm System.*
8. *This contractor shall connection and terminate all required power for the kitchen equipment. Kitchen equipment is furnished and installed by the owner.*
9. *Include an allowance of _____ to perform upgrades to campus fire alarm system.*
10. *Include furnishing and installing temporary power for the site and Construction Manager's trailer.*
11. *Include all utility fees and aid to construction costs as necessary for permanent power.*
12. *Include demolition of electrical items noted on site plan.*
13. *Include removing overhead power lines and power poles noted on site plan.*
14. *Include an allowance of $160,000 for upgrades to the existing fire alarm system on campus yet to be incorporated into the design.*

Related Work by Others:

1. Concrete equipment pads by W.C. 10.
2. Fire protection system and risers by W.C. 26.
3. Installation of access panels/doors by W.C. 21 or 11.
4. Low voltage wiring not identified on the drawings by the trade providing equipment.
5. Site utilities to transformers/cabinets by Utility Company.
6. Temperature Control wiring and conduit associated with the mechanical systems by W.C. 27.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $30,000 for temporary power consumption. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 28

Work Category No. 30 – Elevators

Work Included:

The subcontractor shall timely perform all Elevator work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

07 84 13 Penetration Firestopping – As it relates to this scope of work.

14 24 23 Hydraulic Passenger Elevator

Work Category No. 00

Work Category Notes:

1. Furnish all equipment, material and labor necessary for a elevators, including but not limited to doorsills, doorframes, protective padding, fire detection and alarm systems, elevator equipment, controllers and push buttons (including low voltage wiring), cab lighting, signage, supports, hangers, grounds, blocking, shims, sheaves, sheave beams, steel framing support, sill supports, and all necessary anchoring devices required for a complete elevator installation. Identify in advance, installation of sleeves, cut outs and any other items that are embedded in concrete or masonry for elevator equipment. Furnish approved erection/layout shop drawings clearly identifying embedment/anchoring locations from fixed elevation, column line or corner of hoistways. Include all hoisting equipment, scaffolding, working platforms, temporary bracing, etc. to complete elevator work.
2. Submit for field use, drawings showing any special conditions; i.e., pit size, shaft requirements, elevator machine room requirements, layout, electrical requirements, concrete embedments, etc. as soon as possible after award of contract.
3. Furnish and deliver all embedded supports, anchorage, inserts and deliver FOB jobsite. All embedded items shall be clearly marked/labeled per approved erection drawings, and appropriately delivered to assigned subcontractor responsible for installation of embedded items. 48-hour advance notification of embedded shipments will be required for proper coordination with others. All deliveries to be closely coordinated and approved by the Construction Manager prior to shipments
4. Include drilling for hydraulic (jack) shafts and removal of spoils (if applicable). Coordinate schedule and access for drilling equipment with the Construction Manager. This contractor is responsible for dewatering at shaft drilling until the hydraulic shaft is installed.
5. Coordinate with the Construction Manager and electrical trade contractor the power requirements and location of same.
6. Prior to beginning installation verify all field conditions and measurements, reporting any discrepancies to the Construction Manager.
7. Provide safety barricades at all the shaft openings during this trades work. These barricades are to be maintained until the shafts are enclosed and free of fall hazards.
8. This subcontractor shall be responsible for fire wall penetrations required for this work and proper sealing of same.

9. This subcontractor shall be responsible for issuing the Elevator Pre-Inspection Checklist to the Construction Manager at least one week prior to elevator inspection.

10. This subcontractor shall cooperate with and allow "work required by divisions other than Division #14" related trades to access and complete their respective work during normal work hours. For example:

    - Fire protection at pits, hoistways and machine rooms.
    - Shaft walls and completion of walls into door frames, as directed by this subcontractor
    - Pit ladder and sump pit cover - Furnished and installed by others, however located by this subcontractor
    - Pit electrical - light, switch and receptacle by others, however located by this subcontractor
    - Grouting of sills - by other
    - Hydraulic elevator jack hole concrete floor infilled with concrete by others, however located by this subcontractor
    - Machine room access for all required work
    - Elevator cab flooring – by others.

11. This subcontractor to include within proposal pricing, an operator dedicated to run 1 elevator(s) for a period of 2 months (50 hrs/week), for use until turnover.

12. This contractor will be required to coordinate in BIM through a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 0131 13.23. Your attendance will be required for these meetings. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination.

Related Work by Others:

1. Power supply and final hook-up for elevators by W.C. 28.
2. Concrete elevator pit by W.C. 10.
3. Elevator pit ladder (and hoist beam if applicable) by W.C. 12.
4. Concrete embeds and anchor bolts as directed by this contractor's shop drawings.
5. Finish painting by W.C. 24.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 30

Work Category No. 30 – Elevators

Work Included:

The subcontractor shall timely perform all Elevator work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

07 84 13 Penetration Firestopping – As it relates to this scope of work.

14 24 23 Hydraulic Passenger Elevator

Work Category No. 00

Work Category Notes:

1. Furnish all equipment, material and labor necessary for a elevators, including but not limited to doorsills, doorframes, protective padding, fire detection and alarm systems, elevator equipment, controllers and push buttons (including low voltage wiring), cab lighting, signage, supports, hangers, grounds, blocking, shims, sheaves, sheave beams, steel framing support, sill supports, and all necessary anchoring devices required for a complete elevator installation. Identify in advance, installation of sleeves, cut outs and any other items that are embedded in concrete or masonry for elevator equipment. Furnish approved erection/layout shop drawings clearly identifying embedment/anchoring locations from fixed elevation, column line or corner of hoistways. Include all hoisting equipment, scaffolding, working platforms, temporary bracing, etc. to complete elevator work.
2. Submit for field use, drawings showing any special conditions; i.e., pit size, shaft requirements, elevator machine room requirements, layout, electrical requirements, concrete embedments, etc. as soon as possible after award of contract.
3. Furnish and deliver all embedded supports, anchorage, inserts and deliver FOB jobsite. All embedded items shall be clearly marked/labeled per approved erection drawings, and appropriately delivered to assigned subcontractor responsible for installation of embedded items. 48-hour advance notification of embedded shipments will be required for proper coordination with others. All deliveries to be closely coordinated and approved by the Construction Manager prior to shipments
4. Include drilling for hydraulic (jack) shafts and removal of spoils (if applicable). Coordinate schedule and access for drilling equipment with the Construction Manager. This contractor is responsible for dewatering at shaft drilling until the hydraulic shaft is installed.
5. Coordinate with the Construction Manager and electrical trade contractor the power requirements and location of same.
6. Prior to beginning installation verify all field conditions and measurements, reporting any discrepancies to the Construction Manager.
7. Provide safety barricades at all the shaft openings during this trades work. These barricades are to be maintained until the shafts are enclosed and free of fall hazards.
8. This subcontractor shall be responsible for fire wall penetrations required for this work and proper sealing of same.

9. This subcontractor shall be responsible for issuing the Elevator Pre-Inspection Checklist to the Construction Manager at least one week prior to elevator inspection.

10. This subcontractor shall cooperate with and allow "work required by divisions other than Division #14" related trades to access and complete their respective work during normal work hours. For example:
    - Fire protection at pits, hoistways and machine rooms.
    - Shaft walls and completion of walls into door frames, as directed by this subcontractor
    - Pit ladder and sump pit cover - Furnished and installed by others, however located by this subcontractor
    - Pit electrical - light, switch and receptacle by others, however located by this subcontractor
    - Grouting of sills - by other
    - Hydraulic elevator jack hole concrete floor infilled with concrete by others, however located by this subcontractor
    - Machine room access for all required work
    - Elevator cab flooring – by others.

11. This subcontractor to include within proposal pricing, an operator dedicated to run 1 elevator(s) for a period of 2 months (50 hrs/week), for use until turnover.

12. This contractor will be required to coordinate in BIM through a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 0131 13.23. Your attendance will be required for these meetings. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination.

Related Work by Others:

1. Power supply and final hook-up for elevators by W.C. 28.
2. Concrete elevator pit by W.C. 10.
3. Elevator pit ladder (and hoist beam if applicable) by W.C. 12.
4. Concrete embeds and anchor bolts as directed by this contractor's shop drawings.
5. Finish painting by W.C. 24.

Allowances:

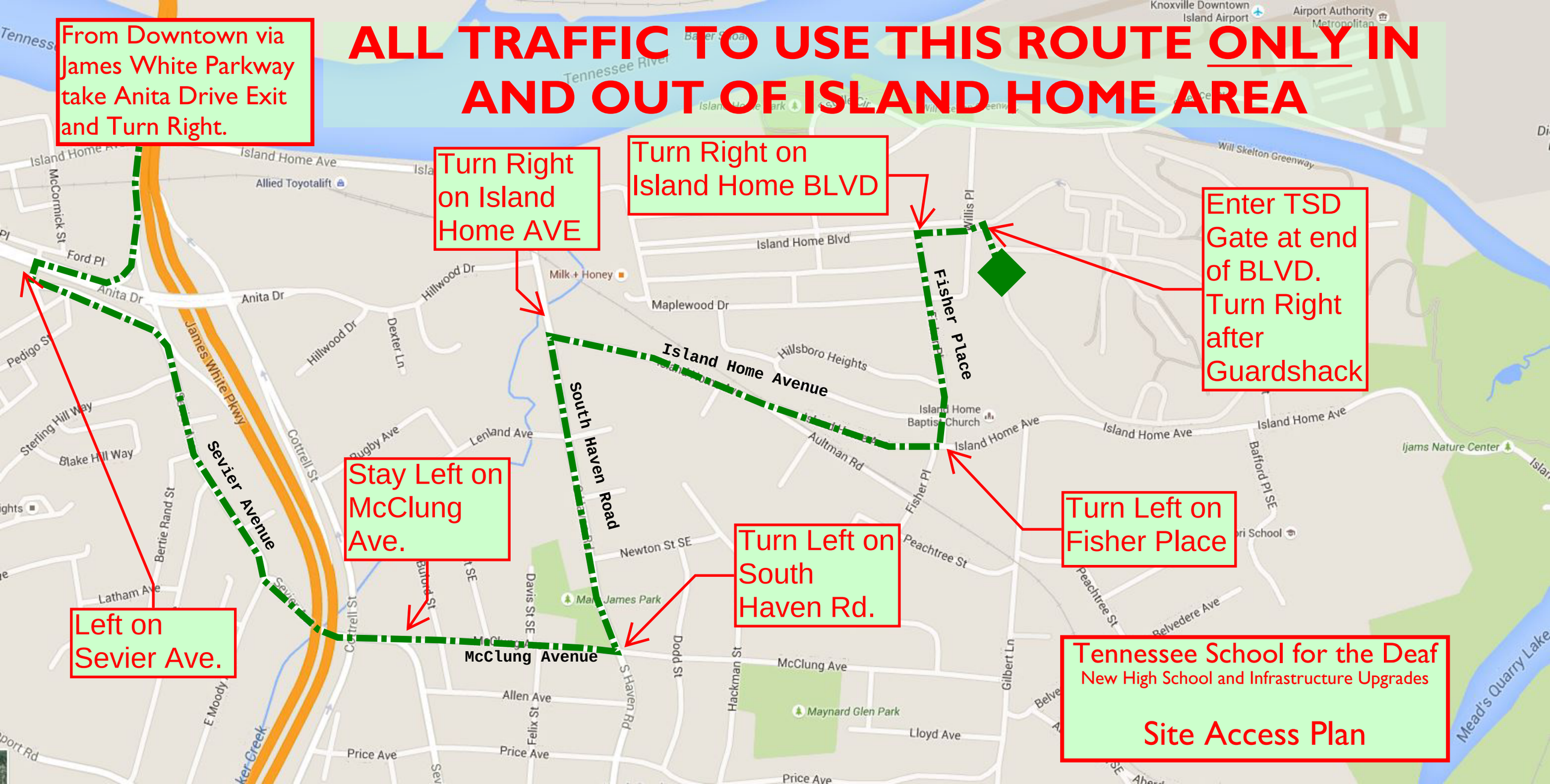
This Contractor shall include in their Base Bid a Construction Manager's allowance of $_____. Reference Section 01020 for specific instructions on allowances.

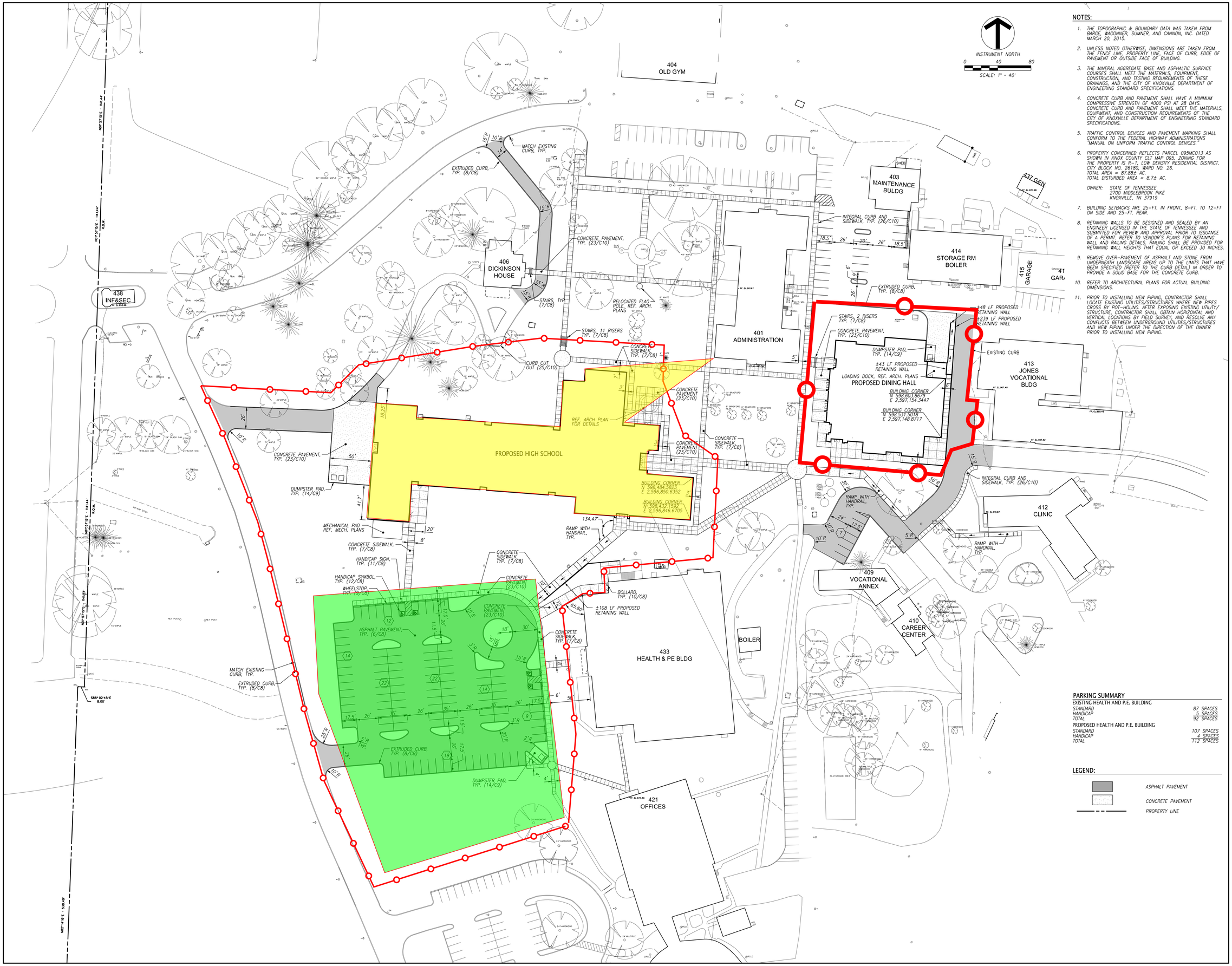
Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 30

ALL TRAFFIC TO USE THIS ROUTE ONLY IN AND OUT OF ISLAND HOME AREA





NOTES:

1. THE TOPOGRAPHIC & BOUNDARY DATA WAS TAKEN FROM BARGE, WAGONNER, SUMNER, AND CANNON, INC. DATED MARCH 20, 2015.
2. UNLESS NOTED OTHERWISE, DIMENSIONS ARE TAKEN FROM THE FENCE LINE, PROPERTY LINE, FACE OF CURB, EDGE OF PAVEMENT OR OUTSIDE FACE OF BUILDING.
3. THE MINERAL AGGREGATE BASE AND ASPHALTIC SURFACE COURSES SHALL MEET THE MATERIALS, EQUIPMENT, CONSTRUCTION, AND TESTING REQUIREMENTS OF THESE DRAWINGS, AND THE CITY OF KNOXVILLE DEPARTMENT OF ENGINEERING STANDARD SPECIFICATIONS.
4. CONCRETE CURB AND PAVEMENT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. CONCRETE CURB AND PAVEMENT SHALL MEET THE MATERIALS, EQUIPMENT, AND CONSTRUCTION REQUIREMENTS OF THE CITY OF KNOXVILLE DEPARTMENT OF ENGINEERING STANDARD SPECIFICATIONS.
5. TRAFFIC CONTROL DEVICES AND PAVEMENT MARKING SHALL CONFORM TO THE FEDERAL HIGHWAY ADMINISTRATIONS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
6. PROPERTY CONCERNED REFLECTS PARCEL 095MC013 AS SHOWN IN KNOX COUNTY CLT MAP 095. ZONING FOR THE PROPERTY IS R-1, LOW DENSITY RESIDENTIAL DISTRICT. CITY BLOCK NO. 26180, WARD NO. 26.
   TOTAL AREA = 87.88± AC.
   TOTAL DISTURBED AREA = 8.7± AC.

   OWNER: STATE OF TENNESSEE
   2700 MIDDLEBROOK PIKE
   KNOXVILLE, TN 37919
7. BUILDING SETBACKS ARE 25-FT. IN FRONT, 8-FT. TO 12-FT ON SIDE AND 25-FT. REAR.
8. RETAINING WALLS TO BE DESIGNED AND SEALED BY AN ENGINEER LICENSED IN THE STATE OF TENNESSEE AND SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO ISSUANCE OF A PERMIT. REFER TO VENDOR'S PLANS FOR RETAINING WALL AND RAILING DETAILS. RAILING SHALL BE PROVIDED FOR RETAINING WALL HEIGHTS THAT EQUAL OR EXCEED 30 INCHES.
9. REMOVE OVER-PAVEMENT OF ASPHALT AND STONE FROM UNDERNEATH LANDSCAPE AREAS UP TO THE LIMITS THAT HAVE BEEN SPECIFIED (REFER TO THE CURB DETAIL) IN ORDER TO PROVIDE A SOLID BASE FOR THE CONCRETE CURB.
10. REFER TO ARCHITECTURAL PLANS FOR ACTUAL BUILDING DIMENSIONS.
11. PRIOR TO INSTALLING NEW PIPING, CONTRACTOR SHALL LOCATE EXISTING UTILITIES/STRUCTURES WHERE NEW PIPES CROSS BY POT-HOLING. AFTER EXPOSING EXISTING UTILITY/STRUCTURE, CONTRACTOR SHALL OBTAIN HORIZONTAL AND VERTICAL LOCATIONS BY FIELD SURVEY, AND RESOLVE ANY CONFLICTS BETWEEN UNDERGROUND UTILITIES/STRUCTURES AND NEW PIPING UNDER THE DIRECTION OF THE OWNER PRIOR TO INSTALLING NEW PIPING.

PARKING SUMMARY

EXISTING HEALTH AND P.E. BUILDING	
STANDARD	87 SPACES
HANDICAP	5 SPACES
TOTAL	92 SPACES
PROPOSED HEALTH AND P.E. BUILDING	
STANDARD	107 SPACES
HANDICAP	4 SPACES
TOTAL	112 SPACES

LEGEND:

ASPHALT PAVEMENT

CONCRETE PAVEMENT

PROPERTY LINE

Tennessee School for the Deaf
New High School and Infrastructure Upgrades

Knoxville, Tennessee
SBC # 168 / 007-01-2013

SITE LAYOUT AND PAVING PLAN

THE LEWIS GROUP ARCHITECTS
6512 DEANE HILL DRIVE | KNOXVILLE, TN 37919
PH. 865.584.50000 | FX. 865.588.1272
63 OCOEE ST. | CLEVELAND, TN 37311
PH. 423.476.0012
info@lewisgroup.net | www.lewisgroup.net

FULGHUM MACINDOE & ASSOCIATES INC.
10330 HARDIN VALLEY ROAD
SUITE 201
KNOXVILLE, TN 37932
OFFICE: 865.690.6419
FAX: 865.690.6448
www.fulghummacindoe.com
FMA PROJECT: 251.017

PROJECT REVISIONS

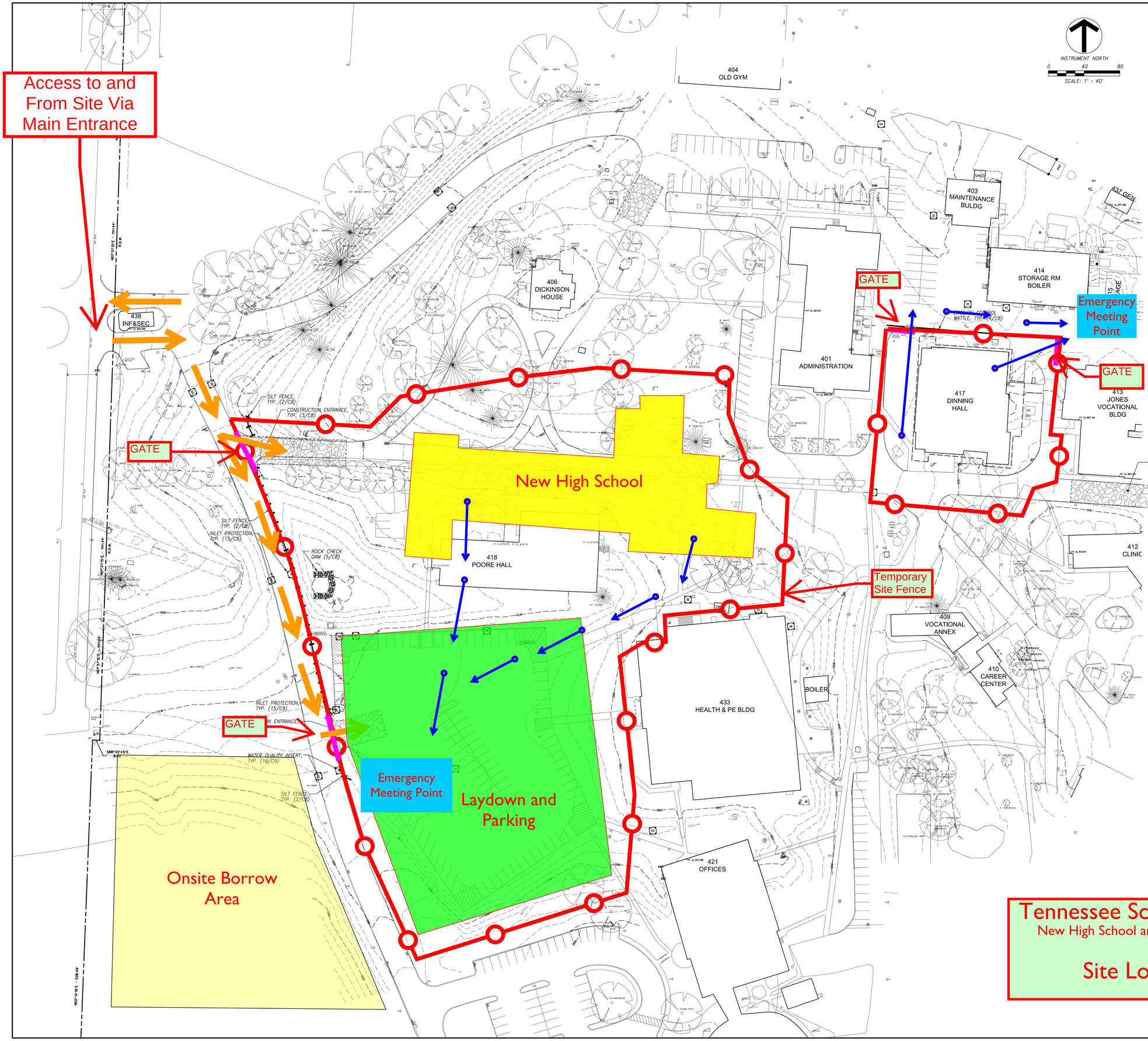
#	DATE	DESCRIPTION

THIS DRAWING IS THE PROPERTY OF THE LEWIS GROUP ARCHITECTS, INC., P.C. AND IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. THIS DRAWING IS NOT TO BE USED ON ANY OTHER PROJECT WHETHER THE PROJECT IS COMPLETED, PARTIALLY COMPLETED OR NOT. THIS DRAWING AND ITS CONTENTS ARE THE SOLE POSSESSION OF THE LEWIS GROUP ARCHITECTS, INC., P.C. AND SHALL NOT BE UTILIZED IN ANY WAY WITHOUT THEIR FULL CONSENT, IF IS TO BE RETURNED UPON REQUEST.

Project Number
14042

8/28/2015

C3



EROSION CONTROL NOTES:

1. EROSION CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE TDEC'S EROSION AND SEDIMENT CONTROL HANDBOOK AND TDEC'S CONSTRUCTION ACTIVITY PERMIT REQUIREMENTS. THE DEVICES SHOWN ON THE DRAWINGS ARE THE MINIMUM REQUIRED. THE CONTRACTOR SHALL PROVIDE ADDITIONAL EROSION CONTROL DEVICES AS NEEDED.
2. INSTALL TEMPORARY SEDIMENT TRAP(S) WHERE SHOWN OR AS OTHERWISE APPROPRIATE. CONSTRUCT AND MAINTAIN IN ACCORDANCE WITH THE REQUIREMENTS OF TDEC'S EROSION & SEDIMENT CONTROL HANDBOOK. MUDDY WATER COLLECTED IN SEDIMENT TRAP(S) SHALL BE HELD UNTIL IT IS AT LEAST AS CLEAR AS UPSTREAM WATER BEFORE IT IS DISCHARGED TO SURFACE WATERS. DISCHARGE THROUGH A PIPE OR LINED CHANNEL SO THAT THE DISCHARGE DOES NOT CAUSE EROSION & SEDIMENTATION.
3. INSTALL TEMPORARY DIVERSION BERMS OR DIVERSION CHANNELS AS NECESSARY TO DIVERT STORM WATER FROM RUNNING ONTO THE DISTURBED AREAS AND TO DIVERT RUNOFF FROM DISTURBED AREAS TO THE TEMPORARY SEDIMENT TRAP(S).
4. APPLY TEMPORARY SEEDING WHENEVER GRADING OPERATIONS ARE TEMPORARILY HALTED FOR OVER 14 DAYS AND FINAL GRADING OF EXPOSED SURFACES IS TO BE COMPLETED WITHIN ONE YEAR. APPLY TEMPORARY SEEDING TO SOIL STOCKPILES.
5. APPLY PERMANENT SEEDING WHENEVER GRADING OPERATIONS ARE COMPLETED AND ALL CONSTRUCTION OPERATIONS WILL NOT IMPACT THE DISTURBED AREA. APPLY PERMANENT SEEDING TO ALL NON-CONSTRUCTION AREAS, WHICH SHOW SIGNS OF EXCESSIVE EROSION.
6. PERMANENT SEEDING SHALL BE DROUGHT TOLERANT, HYBRID KENTUCKY 31 (JAGUAR, LANCER, REBEL II, FALCON II, ETC.). SEED AT A RATE OF 6–8 LBS./1000 S.F. USE A SLOW RELEASE STARTER FERTILIZER WITH 1 LBS./1000 S.F. NITROGEN. IF GRADING IS PERFORMED DURING THE WINTER MONTHS, SEED MIXTURE SHALL BE SUPPLEMENTED WITH A WINTER RYE OR OTHER APPROPRIATE MIXTURE TO ASSURE STABILIZATION DURING THE WINTER SEASON.
7. MULCH WITH STRAW AT A RATE OF 100 LBS./1000 S.F. OVER THE SEEDED AREAS.
8. EXCAVATE STORMWATER SEDIMENT PONDS AS FIRST ITEM OF CONSTRUCTION.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF SITE CONSTRUCTION POLLUTION PREVENTION CONTROLS THROUGHOUT THE LIFE OF THE PROJECT.
10. THIS SITE IS A PRIORITY CONSTRUCTION ACTIVITY PER KNOX COUNTY STORMWATER MANAGEMENT MANUAL, VOLUME 2, CHAPTER 9.
11. ADEQUATE DRAINAGE, EROSION AND SEDIMENT CONTROL MEASURES, BEST MANAGEMENT PRACTICES, AND/OR OTHER STORMWATER MANAGEMENT FACILITIES SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION. DAMAGES TO ADJACENT PROPERTY AND/OR THE CONSTRUCTION SITE CAUSED BY THE CONTRACTOR'S OR PROPERTY OWNER'S FAILURE TO PROVIDE AND MAINTAIN ADEQUATE DRAINAGE AND EROSION/SEDIMENT CONTROL FOR THE CONSTRUCTION AREA SHALL BE THE RESPONSIBILITY OF THE GRADING PERMITEE.

Tennessee School for the Deaf
New High School and Infrastructure Upgrades
Site Logistics Plan

Tennessee School for the Deaf
New High School and Infrastructure Upgrades

Knoxville, Tennessee
SBC # 168 / 007-01-2013

EROSION PREVENTION & SEDIMENT CONTROL PLAN–STAGE 1

THE LEWIS GROUP
ARCHITECTS
6512 DEANE HILL DRIVE | KNOXVILLE, TN 37919
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#	DATE	DESCRIPTION

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Project Number
14042

8/28/2015

C4

FROM:
Bidder's Name:_____

Bidder's Address:_____
_____

TO: Rentenbach Constructors, Inc.
2400 Sutherland Avenue
Knoxville, TN 37919-2354

Re: Tennessee School for the Deaf
2725 Island Home Boulevard, Knoxville, TN

Gentlemen:

Having carefully examined General Conditions, Supplementary Conditions, General Requirements, Advertisement for Bids, Instructions to Bidders, Proposal Section, Specifications, Drawings, all Addenda issued, Work Category Descriptions, and understanding the scope of work involved in this Work Category (ies) and those that interface with it (them), the undersigned does hereby propose to furnish all labor, materials, insurances, taxes, tools, equipment and services to complete all work required for the Work Category(ies) indicated in accordance with the Work Category Description and the Contract Documents prepared by _____.

High School Total:_____
+
Dining Hall Total:_____
=
BASE PROPOSAL SUM: _____
_____ ($_____)

PERFORMANCE & PAYMENT BOND: The Trade Contractor may be required to furnish a Co-Obligee Labor & Material Payment & Performance Bonds for the full contract amount.
The name of the Bonding Company is: _____.
The sum of ($_____) to cover cost of furnishing these bonds is ***INCLUDED IN*** the base bid.

EXPERIENCE MODIFICATION RATING (EMR):
List the EMR for your firm as determined by your insurance carrier for the past three (3) years.
2013 _____ 2014 _____ 2015 _____

ADDENDA: The following Addenda have been received, are hereby acknowledged, and their execution is included in Bid Sums listed herein.
No _____ Dated _____ No _____ Dated _____ No. _____ Dated _____

TIME AND MATERIAL RATES: Labor rates listed below include the following:

Cost of labor including All Business Tax, Social Security and Medicare, Federal and State Unemployment Tax, and Fringe Benefits Under Collective Bargaining Agreements, and Worker's Compensation Insurance. The rates listed below do not include overhead and/or profit. These rates are only for additions and/or deletions to the contract that could not have been anticipated at the time of the bid.

	TRADE	STRAIGHT TIME	SHIFT TIME	1 1/2 TIME	DOUBLE TIME
1					
2					
3					
4					
5					
6					

OVERHEAD AND PROFIT(FOR FUTURE CHANGES): Overhead and Profit shall include the following: Supervision, Superintendents, Commercial General Liability and Umbrella Insurances, Wage of Time Keepers, Watchmen and Clerks, Small tools with material value of less than $1,500.00. Incidentals, General Office Expense, and all other expenses not included in Labor Rates as listed above. The percentage fee for Overhead and Profit on the Contractor's own work shall be 15% of net cost. The percentage fee for Overhead and Profit on Subcontractor's work shall be 5% (see log).

MANDATORY ALTERNATES:
Reference Specification Section 01100 for alternate descriptions.

Alternate #1 – Standing Seam Metal Roofing in lieu of 50yr Shingle Roofing Add/Deduct $_____
Alternate #2 – Cast Stone in lieu of Rock Face and Smooth Brick Color #2 Add/Deduct $_____
Alternate #3 – Auto Operators at Entry Doors Add/Deduct $_____
Alternate #4 – Geothermal System in lieu of Water Source Heat Pumps Add/Deduct $_____

UNIT PRICES:

Item #	Description	Unit Cost	Per Unit
1			
2			
3			
4			
5			
6			

VOLUNTARY ALTERNATIVES (Variations From Materials Specified):
Undersigned proposes the following voluntary alternates for materials and/or equipment specified, it being understood that, should any voluntary alternate(s) be accepted by the Owner, applicable amount(s) hereinafter listed will be added to or deducted from the Base Bid. (No voluntary alternates are required)

1. _____ $ _____ (Add/Deduct)
2. _____ $ _____ (Add/Deduct)
3. _____ $ _____ (Add/Deduct)

SCHEDULE:
The undersigned if awarded a Contract, agrees to work concurrently with the work of other Trade Contractors and the Construction Manager, according to the "Approved Construction Schedule." Achieve Substantial Completion of the Work in accordance with the number of calendar days Contract Time set forth, allotted from and including the date stipulated in the Notice to Proceed; and, accept the conditions for Liquidated Damages in the amount of $3,000 set forth per calendar day.

BIDDER'S CERTIFICATE:

The Bidder hereby acknowledges, attests, certifies, warrants, and assures that:

1. Bidder has received, read and understands the Bidding Documents and this bid is made in accordance therewith.
2. Bidder has visited the site and become familiar with the local conditions under which the work is to be performed, and has correlated all observations with the requirements of the Bidding Documents.
3. Documents identified as "Information Available to Bidders" are prepared solely for the Designer's use in design of this Work and have not been relied upon in the preparation of this bid. The use and interpretation of such information for any purpose is entirely the responsibility of the using party.
4. Contractors and Subcontractors that have been disqualified from participating in State Building Commission projects have not been included in this bid and will not be allowed to perform work under the contract that may result.
5. Bidder shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor or consultant who will utilize the services of an illegal immigrant in the performance of this Contract.
6. The required Bid Security, in the amount of five percent (5%) of the total amount of bid, including alternates, is attached hereto.
7. Failure to complete this Bid Form, provide required attachments, or comply otherwise with instructions to Bidders, may be cause for rejection of bid.
8. The person who signs this bid on behalf of the Bidder is legally empowered to bind the Bidder to a Contract.
9. This Bidder's status, as required by the State Building Commission Policy and Procedures, is:
   (True or False)_____The Bidder and/or any of the Bidder's employees, agents, independent contractors and/or proposed Subcontractors have been convicted of, pled guilty to, or pled nolo contendere to any contract crime involving a public contract.
   (Yes or No)_____The Bidder is a "Certified Diversity or Disadvantaged Business Enterprise," Women Owned, Minority Owned, or Small Business, per TCA. § 12-3-801808. If "Yes", then indicate the applicable status and name the Certifying Agency below.
   Status: _____
   Certifying Agency:_____
10. Bidder understands and agrees that the lump sum bid price includes all taxes such as sales, use, excise, licenses, etc., now or hereafter imposed by Federal, State or other government agencies upon the equipment, labor and materials specified, and that all said taxes shall be paid by the Contractor.
12. This Bidder agrees to:

A. Honor this bid for a period of sixty (60) days following the date of the scheduled opening of bids.
B. Enter into and execute a contract, if presented on the basis of this bid, and to furnish certificates(s) of insurance, bond(s), and other documents related to the contract as required by the Bidding Documents.
C. Accomplish the Work in accordance with the Contract Documents.
D. Furnish Three Year Roof Bond in the form of Section 00 61 43

I hereby certify that all statements herein are made on behalf of

_____
(Name of Corporation, Partnership or Person Submitting a Bid)

A Corporation organized and existing under the laws of the State of _____

An individual doing business as _____

Signature:
Title:
Address:

Phone:
Fax:
Email:

AGREEMENT FORMS

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONSTRUCTION MANAGER / GENERAL CONTRACTOR

A. Form of Agreement will be that shown as document **00 52 23** of this project manual, and will be filled out as indicated below.

B. The following information and provisions will be filled in prior to the presentation of the Agreement form to Construction Manager / General Contractor by Owner.

1. Contracting Agency, CM / GC, Project, and Designer will be identified on page one.

2. A full enumeration of the Contract Documents which make up the Agreement will be provided in Article 1.

3. Provisions for Contract Time and Liquidated Damages will be incorporated in Article 2.

4. The Contract Sum and the basis upon which it is determined, and Unit Prices proposed as a part of the successful bid which are accepted by the Owner, will be stated in Article 3.

5. The signature page will provide for a single signature by the CM / GC, and will provide for the several signatures on behalf of the Owner as required by law and policy.

C. Date of Agreement will be filled in by Owner when last signature is affixed. Last signature will be by Owner.

END OF SECTION

STATE OF TENNESSEE

Real Estate Asset Management

Construction Services Agreement Between Owner and Construction Manager / General Contractor

where the Basis of Payment is a
GUARANTEED MAXIMUM PRICE

Use only with the coordinated documents identified in the current
Designers' Manual
for projects of the State Building Commission of Tennessee

AGREEMENT

made as of the day of in the year of Two Thousand Fourteen

BETWEEN the Owner: STATE OF TENNESSEE, Department of General Services

and the Contractor:

the Project:

, ,
SBC Project No.

the Designer:

,

The Owner and the CM / GC agree as set forth below.

ARTICLE 1
THE WORK AND THE CONTRACT DOCUMENTS

1.1 The Construction Manager / General Contractor shall perform all the Work required by the Contract Documents for the Project identified on page one.

1.2 The Contract Documents include the Master Contract and the Individual Contract elements of the Contract Documents identified below in Paragraph 1.4. These form the Contract and together constitute the entire agreement between the Owner and the Contractor, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. An enumeration of the Contract Documents appears in Paragraph 1.4.

1.3 Terms used in this Agreement which are defined in the Conditions of the Contract shall have the meanings designated in those Conditions.

1.4 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

The Construction Manager / General Contractor (CM/GC) Master Contract
Dated _____between the State of Tennessee, Department of General Services and for the project titled:

, ,
SBC Project No.

This Agreement
Conditions of the Contract:
AIA 1997 Edition A201 General Conditions dec 07 OFD 007223 CM/GC as modified (48 pages)
STREAM September 2012 Std LF 007315 Supplementary Conditions (2 pages)

Specifications

Drawings, dated _____, as identified in the Project Manual

The portions of the following addenda as pertain to the documents listed above:

Scope of Services and Deliverables
Document dated _____

Standard Bidding and Construction Documents applicable to the CM/GC's Work that are included in the Owner's Designers' Manual:

00 38 60.....Disqualified Contractors and Subcontractors
00 54 33.....ACH form
00 54 35.....Substitute W-9 form
00 61 13.....Contract Bond
01 21 19.....Allowances
01 22 13.....Unit Prices
01 26 00.....Contract Modification Procedures
01 26 10 CM / GC – GMP Contingency and Owner Reserve Procedures
01 26 20.....Weather Delays
01 26 39 Form For Field Order
01 26 40.....Form for Amendment, Change Order or Directive
01 26 50.....Cost Itemization Form
01 29 73.....Schedule of Values
01 29 76.....Payment Procedures
01 29 76.13...Attestation of Personnel Used in Contract Performance
01 31 13.91...Commissioning Coordination
01 31 19.....Project Meetings
01 31 90.....Administrative Logs
01 32 13 Scheduling of Work
01 32 16 Progress Schedules and Reports
01 33 91.....Commissioning Submittals
01 41 15.....Basic Regulatory Requirements
01 43 25.....Testing Laboratory Services
01 52 25 Owner's Field Offices
01 62 25.....Product Options and Substitutions
01 62 32.....Substitution Request Form
01 77 70.....Closeout Procedures
01 77 70.91...Contract Commissioning Closeout
01 78 21G.....Closeout Submittals (detailed Example)
01 78 88.....Report of Subcontractors and Suppliers
01 79 13.....Demonstration and Training

The Owner's Designers Manual can be accessed at
http://tn.gov/generalserv/psm/rpa/designermanual07.shtml
or a hard copy can be requested through the Owner.

ARTICLE 2
TIME OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

2.1 The Work to be performed under this Contract shall be commenced on the date stipulated in the Notice to Proceed;
and, subject to authorized adjustments, Substantial Completion shall be achieved for the work and each Phase thereof in accordance with the number of calendar days Contract Time allotted each, from and including the Commencement of each, wholly and severally for the Work of each Phase.

_____ Calendar Days From the Notice to Proceed for the Work.

2.2 Liquidated Damages, as set forth in paragraph 9.12 of the General Conditions, are
_____ Per Calendar Day

ARTICLE 3
CONTRACT SUM

3.1 The Owner shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order as provided in the Contract Documents, an amount not to exceed the Guaranteed Maximum Price, also referred to as the "Contract Sum", of

3.2 The Guaranteed Maximum Price (GMP) is determined as follows:

Trade Contracts:	**$**
General Conditions Budget:	**$**
CM / GC Contingency:	**$**
CM / GC Construction Services Fixed Fee:	**$**
Project Related Cost	**$**

Guarantee Maximum Price:	**$**

3.3 Unit Prices will be used as specified.

This instrument may be executed in one or more counterparts. It shall be fully executed when each party whose signature is required has signed at least one (1) counterpart, even though no one (1) counterpart contains the signatures of all the parties to this instrument. Electronic, scanned or facsimile signatures shall have the same force and effect as original signatures. This Agreement entered into as of the day and year first written above as witnessed::

BY CONSTRUCTION MANAGER /
GENERAL CONTRACTOR:

Signature:_____

Name:_____

Title:_____

AND BY OWNER: STATE OF TENNESSEE
Department of General Services

APPROVED:_____
Peter L. Heimbach, Jr., State Architect

APPROVED:_____
Robert E. Oglesby, Commissioner
Department of General Services

APPROVED:_____
Justin P. Wilson, Comptroller of the Treasury
for compliance with policy and statute

APPROVED:_____
Robert E. Cooper, Jr., Attorney General
for form and legality

END of AGREEMENT FORM for the Project titled:

, ,
SBC Project No.

00 52 23.10 SUBCONTRACT AGREEMENT & GUARANTEE

See Attached Sample Subcontract Agreement & Guarantee

RENTENBACH

A CHRISTMAN COMPANY

Job No. **Work Category:**

** Subcontract Agreement **

THIS AGREEMENT, initiated this day, , and as executed herein, is by and between: , with its principal place of business located at: 2400 Sutherland Avenue, Knoxville, TN 37931 (hereinafter called the Contractor) and , with its principal place of business located at: , , (hereinafter called the Subcontractor).

WITNESSETH

That Contractor and this Subcontractor, for the good and valuable consideration identified herein, which the parties acknowledge is sufficient, do hereby agree to the following:

ARTICLE I - PROJECT

The Subcontractor agrees to timely, properly and completely perform and pay for all of the Work, as described in Article IV, for the Contract Sum stated below on the following Project: ; located at: , , for the Owner: , et al. as set forth herein.

ARTICLE II - CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement and the attached exhibits, the scope of Work identified herein, and shall be in accordance with the following bid documents prepared by: located at: , , (herein called the Architect and/or Engineer), including all precontract addenda and subsequent modifications, which documents are incorporated herein by reference and made a part of this Agreement as if fully repeated and which the Subcontractor acknowledges it has completely and thoroughly reviewed and understands, which bid documents include the following:

DRAWINGS: See attached Subcontract Agreement Supplement 'A'.

SPECIFICATIONS: See attached Subcontract Agreement Supplement 'A'.

ADDENDA: See attached Subcontract Agreement Supplement 'A'.

All of which documents are incorporated herein by reference and made a part of this Agreement as if fully repeated and which the Subcontractor acknowledges it has completely and thoroughly reviewed and understands.

ARTICLE III - CONSIDERATION

In consideration of the timely, proper and complete performance of the Work identified herein, Contractor shall pay the Subcontractor, in current funds, subject to Article IV.O. below, the following firm Contract Sum, subject to additions or deletions by Change Order or Construction Change Directive, as provided in the Contract Documents.

CONTRACT SUM:

***** DOLLARS*****

. Work Category

Total for Subcontract:

ARTICLE IV - SCOPE OF WORK

A. SEE ATTACHED SUBCONTRACT AGREEMENT SUPPLEMENT 'A'.

1. Except as otherwise provided in this Subcontract ("Agreement"), Subcontractor shall furnish all labor, materials, tools, equipment, insurance, taxes, supervision, services and all other items and costs necessary to properly and timely prosecute and complete the Work identified, implied and inferred in Supplement A attached hereto (the "Work"), as well as all Work reasonably implied and inferred by Contractor or Owner from Supplement A, being a portion of the Work required of Contractor under its contract with Owner. The Work shall be performed by Subcontractor in a good and workmanlike manner strictly in accordance with this Agreement and the Contract Documents listed in Article II which are incorporated herein by reference.

ARTICLE V - GENERAL PROVISIONS OF THIS AGREEMENT

ACCEPTANCE OF THIS CONTRACT CONSTITUTES AN AGREEMENT WITH THE FOLLOWING CONDITIONS:

A. ENTIRE AGREEMENT.

1. This Agreement supersedes and cancels any prior written or verbal agreements, and shall constitute the only agreement between the parties hereto with respect to the Work or any portion thereof covered by this Agreement; and further, notwithstanding any rules regarding conflicts of laws, both parties agree that should any judicial interpretation of this Agreement be required, then in that event, the laws of the State where the Project is located shall apply. For all purposes, the term "State" shall include all fifty states as well as the District of Columbia, Puerto Rico and any other unincorporated territory of the United States.

2. With the exception of Contractor backcharges for Work not timely, properly or completely performed by Subcontractor, no terms of this Agreement or the nature and extent of the Work under this Agreement may or shall be waived, modified or enlarged, except in writing signed by all the parties hereto.

B. INCORPORATED TERMS.

1. All terms, conditions and requirements of the Main Contract between the Owner and the Contractor (herein after called the Main Contract) including but not limited to its contract documents, but specifically excluding payment and dispute resolution provisions, are incorporated herein and made a part of this Agreement. The Subcontractor assumes toward the Contractor all the obligations and responsibilities specifically including, but not limited to, any insurance, indemnity and defense obligations that the Contractor, by these documents, assumes toward the Owner insofar as the same are applicable to the Work covered in this Agreement; and, except as specifically provided herein, said Subcontractor shall not have any rights which the Contractor does not have to the Owner under any of the documents referenced herein. In addition, all terms, conditions and requirements of this Subcontract shall be incorporated by reference into any other agreements entered into by Subcontractor in connection with the Project. It shall be Subcontractor's obligation and responsibility to see to it that its contracts are drafted consistent with this provision. The Subcontractor's subcontractors shall assume towards the Subcontractor all the obligations and responsibilities specifically including, but not limited to, any insurance, indemnity and defense obligations that the Subcontractor, by these documents, assumes toward the Contractor insofar as the same are applicable to the Work covered in this Agreement.

2. The Subcontractor will perform all Work under this Agreement subject to all the terms and conditions expressed or implied in said documents relating to such Work, it being the full intention hereof that said Subcontractor will fully, properly and faithfully discharge all obligations of the Contractor relating thereto. The Subcontractor warrants that it has truly and fully acquainted itself with the site, all site conditions, and the contract documents relating to the Work to be done by the Contractor for the Owner.

3. If the Work requires Subcontractor to procure design services, the Subcontractor shall provide those design services necessary to satisfactorily complete the Work. Design services provided by Subcontractor shall be procured from licensed design professionals

retained by the Subcontractor as required by the law (the "Subcontractor's Designer") of the place where the Project is located. The Subcontractor's Designer's seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by Subcontractor's Designer. Contractor shall be entitled to rely upon the adequacy, accuracy and completeness of the services and certifications or approvals performed by Subcontractor's Designer. The Subcontractor shall be responsible for conformance of its design with the information given and the design concept expressed, inferred and reasonably implied by the

C. APPROVAL.

1. This Agreement shall be expressly contingent upon the Subcontractor being approved by the Owner or authorized agent thereof, provided, however, the Subcontractor shall have five (5) days after notice in the event the Subcontractor is disapproved, in which to attempt to overcome its disqualification to the sole satisfaction of the Owner; otherwise this Agreement shall be deemed null and void.

D. AGREEMENT INTERPRETATION.

1. To the extent which the contract documents of the Main Contract give to the Architect and/or Engineer or Owner various power to determine quantities, quality and other factors relating to the performance of Work under said Main Contract, the determinations of such Architect and/or Engineer, known hereafter as Owner's contracting authority, or Owner, shall be binding on the Subcontractor to the same extent they are binding on Contractor.

2. The Subcontractor shall secure and pay for all permits, fees, licenses, assessments, inspection and taxes necessary to complete the Subcontractor's Work in accordance with the Contract Documents.

E. INSPECTION, SUBMITTALS AND SUBSTITUTIONS.

1. The Owner, Architect and/or Engineer, or the Contractor and/or their representatives, shall have full and free access at reasonable hours to the shops, factories, or other places of business of the Subcontractor, or its sub-subcontractors or suppliers, in order that the Contractor may inform itself as to the general condition and progress of the Work herein contemplated.

2. No substitutions shall be permitted relating to the Subcontractor's Work unless Subcontractor first receives express approval in writing by Contractor for the substitution. The Subcontractor shall indemnify, defend and hold harmless the Contractor for any damages or increased costs incurred by the Contractor as a result of or arising out of such substitutions, regardless of whether the Subcontractor has obtained approval.

F. BONDS.

1. If bonds are required at any time by the Contractor, the Subcontractor shall pay for and deliver, within ten (10) days from the execution of this Agreement, a separate Performance Bond and a separate Labor & Material Payment Bond in the forms acceptable to the Contractor and each in the full amount of this Agreement, issued by a United States Treasury listed surety company with an AM Best rating of A or better, approved to do business in the State where the Project is located, and acceptable to the Contractor and duly executed by those agents with complete Power of Attorney to the full limits therein.

2. The Contractor shall have the right, without notice to such surety company, to order changes in the performance or time of performance of this Agreement necessary to conform to changes in the Main Contract. The above provision shall not prejudice the right of the Contractor to require of the Subcontractor additional performance and payment bonds equal to any increase in the value of the Work.

G. TAXES AND BENEFITS.

1. The Subcontractor accepts and assumes exclusive liability for and shall defend, indemnify and save harmless the Contractor and the Owner against the payment of:

a. All contributions, taxes or premiums which may be payable under Federal and State Unemployment Compensation, Federal Social Security Act, hospitalization and medical assistance and all other Governmental Agency Regulations covering employees, by whomsoever employed, engaged in the performance of the Work included in this Agreement.

b. The contributions and fringe benefits measured by wages of its employees and the employees of its subcontractors required by the Social Security Act, The Federal Income Tax, unemployment tax or any tax under the laws of the State where the Project is located requiring the employer to make withholdings from the wages of the employees, and the Subcontractor accepts exclusive liability for all of such withholding. The Subcontractor shall certify before receiving a final payment that all such taxes or sums required to be withheld from the employees are paid.

c. All sales, use or other taxes, payable by the Subcontractor arising out of the furnishing or installing by the Subcontractor of any and all kinds of material, equipment or personal property under this Agreement.

d. All union health, vacation, pension, travel pay, and other fringe benefits, dues, apprenticeship or industry advancement funds which may be measured by wages of his employees or sub-contractors shall be paid by the

H. INSURANCE.

1. The Subcontractor warrants and represents that it is protected by occurrence based policies of insurance for general liability, including comprehensive, products and completed operations, hazard, contractual and independent contractors, and where applicable, underground hazard and/or explosion and collapse, as well as automobile liability, workman's compensation and employer's liability and agrees to maintain such protection in full force and effect for the duration of the Subcontractor's Work and to furnish certificates and policies identifying the Owner, Architect and/or Engineer, and their Directors, Officers and Agents as additional insureds including under the Subcontractor's completed operations coverage, and including other parties, if so specified. Insurance covering the specified additional insured parties shall be primary insurance and all other insurance carried by the additional insured parties shall be excess insurance.

2. The Subcontractor shall maintain all policies and the full liability limits specified within the Main Contract. If no limits are specified in the Main Contract, the following limits shall apply:

a. Worker's Compensation - Statutory Limit
- $500,000 Employer's Liability

b. Commercial General Liability

1) Bodily Injury - $2,000,000 Each Occurrence
- $2,000,000 Project Aggregate

2) Property Damage - $2,000,000 Each Occurrence
- $2,000,000 Project Aggregate

Subcontracts greater than $3,000,000.

1) Bodily Injury - $5,000,000 Each Occurrence

- $5,000,000 Project Aggregate

2) Property Damage - $5,000,000 Each Occurrence
- $5,000,000 Project Aggregate

c. Comprehensive Automobile Liability

1) Bodily Injury - $2,000,000 Each Occurrence
- $2,000,000 Project Aggregate

2) Property Damage - $2,000,000 Each Occurrence

The above limits may be achieved through any combination of underlying and excess (umbrella) coverage. Unless the Main Contract provides for insurance by and at the expense of the Owner which will protect the Subcontractor against loss, the Subcontractor shall provide for all of his own insurance of every kind.

3. All insurance certificates and policies shall be submitted to Contractor prior to the performance of any Work on site. All certificates and policies shall contain provisions for a 30 day prior written notice to the Contractor and other certificate holders of any pending change or cancellation. If the Subcontractor becomes uninsured for any liabilities specified such default shall be regarded as a material breach of contract, subject to the provisions of Article U herein.

4. All insurance coverage procured by the Subcontractor shall be provided by insurance companies which have policy holder ratings not lower than "A" and financial ratings not lower than "XI" in the Best's Insurance Guide, latest edition in effect as of the date of the Agreement.

5. Products and Completed Operations insurance shall be maintained for a minimum period of the greater of either: (a) at least six (6) years after either the actual Project Substantial Completion Date or final payment, whichever is earlier, or (b) the periods of either the statutes of limitation or the statutes of repose of the State where the Project is located.

6. In the event of loss or damage resulting from perils to material, equipment or structures owned by the Subcontractor, the Subcontractor will look solely to its own insurance for reimbursement for any such loss or damage. The Subcontractor, in signing this Agreement, agrees to hold harmless and defend the Contractor and Owner for any loss or damage to such materials, equipment, and structures.

7. The Subcontractor will be held responsible for any damage to existing structures, Work, materials, or equipment because of its operations and shall repair or replace any damaged structures, Work, materials, or equipment to the satisfaction of, and at no additional cost to the Contractor and/or Owner. The Subcontractor shall be solely and exclusively responsible for any and all insurance deductibles for insurance arising out of or relating to, directly or indirectly, any and all claims in connection to its Work, including but not limited to those claims which would or could be covered by any Builder's Risk insurance policy issued for the Project.

8. The Subcontractor unconditionally waives all of its rights and shall require its insurance carriers, with respect to all insurance policies, to unconditionally waive all rights of subrogation against the Owner, Contractor, and Architect and/or Engineer, their parent companies, affiliates, subsidiaries, partners, directors, officers, agents, and employees and against all other subcontractors, vendors and/or suppliers.

9. Subcontractor represents that its sub-contractors of any tier will provide and maintain the same insurance coverages and conditions as specified in the Article H, including insurance certificates which show the Contractor, Owner, Architect and Engineer

as additional insureds. Subcontractor shall provide copies of Certificate of Insurance to the Contractor if requested by the Contractor.

I. SAFETY.

1. Subcontractor acknowledges receipt of the Contractor's Safety Program and Subcontractor agrees to cooperate and comply with the Owner and/or the Contractor's Safety Program, to take all reasonable precautions and primary responsibility for the safety of its employees on the projects, to assist in the prevention of accidents or injury to persons on or adjacent to the premises where the Work is being performed, and to comply with all federal, state and local safety laws and ordinances applicable to the Work. Subcontractor further acknowledges and accepts full and primary responsibility for safety on the site as it relates to Subcontractor's operations and employees. The Subcontractor agrees to submit to the Contractor, a current Safety Program and Experience Modification Rates for Subcontractor and any sub-subcontractor working at the Project site.

2. All labor, materials and equipment consumed or supplied under this Agreement shall conform to provisions of the Williams Steiger Occupational Safety and Health Act of 1970, and any and all regulations as imposed by the State in which the Work is being performed. It is the responsibility of the Subcontractor to furnish its employees a place of employment free from recognized hazards that are causing, or likely to cause death or physical harm. The Subcontractor shall indemnify and defend the Contractor and be liable for damages as the result of the failure of any Subcontractor employee, or the employees of any of its sub-subcontractors, agents, invitees, vendors or suppliers, to follow the provisions as set forth above.

3. The Subcontractor shall immediately notify Contractor and provide Contractor with copies of all OSHA citations and accident reports, and the Subcontractor shall immediately correct or remedy nonconforming practices or installations.

4. The Subcontractor hereby agrees to release, hold harmless, indemnify and defend the Contractor and the Owner from and against any loss, delay, fine, remedial costs, attorney fees, penalties, interest, action or cause of action arising out of any breach, in whole or in part, by the Subcontractor of this Article.

5. The Subcontractor expressly agrees and understands that the Subcontractor shall abide by all state and federal requirements dictated by the Right To Know Laws where the Project is located. Further, the Subcontractor shall furnish the Contractor copies of Material Safety Data Sheets (MSDS) for all materials to be used in the execution of this Work.

6. The Subcontractor shall immediately correct any unsafe condition(s) identified by Contractor. If Subcontractor fails to immediately correct such unsafe conditions, Contractor may either (1) have the unsafe conditions corrected by others at Subcontractor's expense, or (2) direct that the Work be stopped in the area of the unsafe condition.

7. Subcontractor represents that its sub-subcontractors of any tier will abide by the provisions of this Article I.

J. EQUAL OPPORTUNITY.

1. Subcontractor shall not discriminate against any person with respect to his/her hire, tenure, terms, conditions or privileges of employment because of race, color, age, sex, religion, sexual orientation, the presence of a physical, sensory or mental disability, or national origin.

2. The Subcontractor agrees to comply with all provisions of any applicable State or Federal Fair Employment Practices Code or any similar code applicable in the location where the Project is located.

3. The Subcontractor also agrees to, when dictated by the Main Contract, be awardable by and in compliance with the directives and guidelines of the Contract Compliance Division of the state and federal Civil Rights Commission or any similar commission in the jurisdiction where the Project is located.

4. Subcontractor is responsible for all labor relations matters relating to its performance of the Work and shall at all times maintain harmony among the personnel employed by it and its subcontractors in connection with the Project and those of the Contractor and Owner. Subcontractor shall implement policies and practices to avoid work stoppages, slowdowns, disputes and strikes. Subcontractor shall notify Contractor promptly of any actual or potential labor dispute that may affect the Work. If a labor condition threatens the timely completion of any portion of the Work and/or the Subcontractor, Contractor may, at its option, terminate Subcontractor's right to proceed with Work for default or employ workers to perform the affected Work and backcharge Subcontractor the cost thereof.

5. Neither Subcontractor, nor any of its sub-subcontractors shall engage in any harassment or offensive behavior in connection with the Work. Harassment and offensive behavior includes, but is not limited to, requests to engage in illegal or unethical conduct, or negative comments or actions based on any person's race, color, age, sex, religion, sexual orientation, the presence of a physical, sensory or mental disability, or national origin. Subcontractor shall immediately address any claim of harassment or offensive behavior involving it or its sub-subcontractors, properly discipline any person determined to have engaged in such conduct, including removal from the Project where appropriate and use its best efforts to ensure that such conduct does not reoccur.

6. Subcontractor represents and warrants that it is, and will remain, in compliance with any and all provisions of the Immigration Reform & Control Act of 1986, as amended, the Immigration and Nationality Act, as amended, the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, as amended and all other applicable immigration laws, rules, and regulations, including form I-9 verification, E-Verify, and record keeping requirements. At Contractor's request, Subcontractor shall submit a certification, acceptable to Contractor that its employees have presented the correct documents to legally work in the United States.

K. AGREEMENTS AND ASSIGNMENT.

1. The Subcontractor shall not assign, subcontract and/or sublet this Agreement or any portion thereof, without the prior written consent of the Contractor. Consent will not be given to any proposed agreement which would relieve the Subcontractor or its surety of their responsibilities under this Agreement.

2. The Subcontractor shall make no assignment of any monies due under this Agreement, or which may become due hereunder, without the prior written consent of the Contractor.

L. COOPERATION WITH OTHERS.

1. The Subcontractor agrees to cooperate with the Contractor and with all other subcontractors, vendors and suppliers with whose work Subcontractor may come in contact with or with whom the Subcontractor's schedule may be affected by, in order to avoid any conflict, and to ensure a first class workmanlike job in every respect.

2. In consideration of the permission by the Contractor to use any tools or equipment of any nature whatsoever, including but not limited to elevators, hoists, derricks, cranes, side tracks, yards, or any instrument used in or for the erection of this Project or otherwise, under the terms of any contract between Contractor and Subcontractor, verbal or written, pending the completion of such contract, it is understood and agreed that the Subcontractor assumes complete responsibility and liability for the use or operation of said equipment and to indemnify, defend and hold harmless the Contractor, against any damage, claim, liability, costs or expense whatsoever, accruing or arising in any manner whatsoever because of Subcontractor's use or operation of said equipment or use of same for Subcontractor's benefit, by reason of any accident, incident or event of any nature to persons or property caused thereby, irrespective of who shall actually operate the equipment.

3. Subcontractor shall be responsible for any theft, loss, damage or injury to any of its materials, equipment or tools, or damage to the work of others caused in whole or in part by Subcontractor or its agents, suppliers, or sub-subcontractors, or the employees of any of them.

4. Unless otherwise directed in writing by Contractor, the Subcontractor shall do all cutting, fitting, and patching of its Work that may be required to make its several parts come together properly and to fit it to receive or be received by work of the other trades.

M. CLEAN UP.

1. Subcontractor shall at all times keep the Project and Owner's premises, adjoining premises, streets, and building clear of rubbish caused by its operation and its workmen, and shall remove all such rubbish at its own expense, as directed by the Contractor. The location of all dumpsters shall be as designated by Contractor. Subcontractor shall not dispose of any hazardous waste or waste requiring special manifests in said dumpsters. If the Subcontractor shall fail to clean the site to the satisfaction of the Contractor and/or the Owner then the Contractor may do the necessary cleaning and backcharge the cost thereof against any sums due the Subcontractor.

N. PROTECTION OF FINISHED WORK.

1. Subcontractor will protect all its materials and Work from hazards and be fully responsible for their condition until accepted by the Owner and also shall be responsible for any damage caused by Subcontractor or its sub-subcontractors or suppliers to the Work or property of others including but not limited to the property of the Owner, the Contractor or the property of adjacent land owners, utilities, roads, bridges and waterways.

2. The Subcontractor shall be responsible for damages, defects, defacements or delay of the Project caused in whole or in part by its breach of any provision of this Agreement, and/or by its negligence, and shall forthwith, at its own expense, correct same or accept a reduction in price in the amount of the excess cost incurred by the Contractor or demanded by the Owner, as a result of such default.

O. PAYMENT.

1. For the Work performed by the Subcontractor under this Agreement, the Contractor shall make partial payments to the Subcontractor out of progress payments already received by the Contractor from the Owner, and to the extent permissible by the laws of the State where the Project is located, the receipt of such progress payments is and shall be a strict condition precedent to any payments to the Subcontractor. The Subcontractor will be paid for the Work in place and materials properly stored by the Subcontractor, less retainage, as held by the Owner and/or the Contractor. No payment shall be in any respect taken as an admission by the Contractor of the amount of Work done, its classification, quality or sufficiency of the sum due the Subcontractor or as an acceptance or release of the Subcontractor's responsibility under the terms of this Agreement. After the first partial payment so made to the Subcontractor, the Contractor shall have the right to withhold any subsequent partial payments unless the Subcontractor furnishes with each request for payment, a satisfactory sworn statement and unconditional waivers of lien or bond claims by the Subcontractor for itself and all lower-tier sub-contractors, suppliers, payrolls and all such indebtedness connected with the Subcontractor's Work which were reflected in previous payment requests, and for which payment has been made to the Subcontractor by the Contractor. All material and equipment delivered to the Project site or off site and in the process of fabrication shall become the property of the Owner and shall not be removed from the Project site or damaged in any way. Subcontractor authorizes Contractor to communicate with Subcontractor's vendors, suppliers and sub-subcontractors on payment issues, and to make payment via joint check to any or all of them if, in the sole discretion of Contractor, Contractor determines that joint checks are necessary or appropriate. This authorization is given without the need for any further joint-check arrangements. Any joint check payments made by Contractor shall be deemed to have been made directly to Subcontractor. Upon receipt of a Sworn Statement from Subcontractor, Contractor may issue a joint check for the amount shown on Subcontractors Sworn Statement as due to sub-subcontractor/supplier less any setoffs, back charges, warranty work or other deductions Contractor may be entitled to. Subcontractor waives any claim against Contractor for any errors that may arise out of this joint check arrangement and accepts full responsibility for the validity any endorsements of the joint check(s). Contractor's right to pay by joint check does not create any obligation to do so, and neither the payees of the joint checks or anyone else shall have third party beneficiary or other rights to

enforce this paragraph.

2. Unless the Main Contract between the Owner and the Contractor provides for a different schedule, the Subcontractor will be required to cut off monthly costs on the 20th of the month and get its percent completed approved by the Contractor. Once approved by the Contractor, the Subcontractor must then submit the actual invoice to the Contractor by the 25th of the month in order to receive timely payment.

3. Subcontractor shall, within forty-eight (48) hours after Contractor's written request, discharge or cause to be discharged any lien related in any way to any work of Subcontractor's sub-subcontractors or suppliers. If Subcontractor fails to do so, Contractor, at its sole discretion, may use whatever means necessary to remove any such suit, claim or lien and backcharge Subcontractor for the cost of so doing. Further, Subcontractor shall indemnify Contractor for any costs, fees, including actual attorney fees, incurred by Contractor in removing or attempting to remove such suit, claim or lien. If any liens, bond claims or notice of intention to file are received by the Owner, Architect, or the Contractor, the full amount thereof shall be withheld pending adjustment. If the Subcontractor defaults in payment of its debts on this Project, the Contractor shall have the right to pay such debts and charge them to the Subcontractor. This provision shall not be construed as a waiver of the right of the Subcontractor to file and enforce a lien claim against the Owner or bond claim against the Contractor in the event the Contractor fails to pay the Subcontractor. If Contractor determines, in its sole discretion, that the balance of the Contract Sum then remaining unpaid will not be sufficient to complete the Work in accordance with the Contract Documents, no additional payments will be due the Subcontractor under this Agreement unless and until the Subcontractor, at no cost to Contractor, performs, and pays in full for, a sufficient portion of the Work so that such balance of the Agreement Price then remaining is determined by Contractor to be sufficient to so complete the Work. The Subcontractor shall not stop the Work for any reason in the event of any dispute, whether over payments claimed owed or otherwise. A default in any other contract between Subcontractor and Contractor may, in the sole discretion of Contractor, be considered a default under this subcontract and shall entitle Contractor to set off funds owing under this contract for the claims and/or defaults of any other agreements. In addition, Contractor may withhold payment to Subcontractor for any of the following reasons:

a. Defective Work not remedied; materials not having been furnished; off-site fabrication of materials not meeting production quotas or quality standards; clean-up has not been performed;

b. Subcontractor has damaged any portion of its Work or the work of others;

c. Claims, levies, liens, attachments, stop notices or court orders having been filed or reasonable evidence indicating probable filing of such claims, levies, liens, attachments, notices or orders, including claims covered by insurance until such claims are accepted by the insurance carrier;

d. It is alleged that Subcontractor has failed to make payments properly to its Subcontractors or suppliers for labor (including fringe benefits), materials or equipment, transportation or shipping costs, taxes, fees or any other claims arising out of Subcontractor's Work or Subcontractor fails or refuses to produce proof requested by Contractor that such payments have been made;

e. There exists reasonable doubt that Subcontractor's Work can be completed for the unpaid balance of the Agreement Price or within the Project schedule;

f. Subcontractor is not satisfactorily prosecuting the Work of this Agreement;

g. Subcontractor has failed to deliver current insurance certificates, bonds, submittals, shop drawings, schedules of value, "as built" drawings, written guarantees or warranties or the approvals required of Subcontractor's Work by any authority having jurisdiction;

h. A petition for bankruptcy or reorganization is filed by or against Subcontractor or Subcontractor has made an assignment without the prior written consent of Contractor;

i. Subcontractor's license is not valid or lapses, or Contractor determines Subcontractor has no license;

j. Any violation of any safety rule, law or procedure; or

k. Any other material breach of this Agreement, or any other Contract Documents incorporated herein, by Subcontractor, which has not been cured after forty-eight (48) hours' notice from Contractor.

4. The Subcontractor shall be paid out of moneys received by the Contractor for Work performed by said Subcontractor within seven (7) days after receipt of such moneys by the Contractor. All payments are to be made to the Subcontractor only out of such equivalent payments received by the Contractor for Work done by the Subcontractor. To the extent permissible by the laws of the State where the Project is located, the receipt of such payments by the Contractor shall be a condition precedent to payment to the Subcontractor as stated in Paragraph 1 above.

5. Final payment shall be made after completion and the Owner's acceptance of and payment for all Work, upon presentation of a final request for payment accompanied by a release or other satisfactory evidence that there are no liens, bond claims, claims or other indebtedness connected with the work of the Subcontractor, and submittal of the Subcontractor's guarantee. Before the Contractor shall be obligated to make final payment, Subcontractor, as a condition precedent, shall submit to the Contractor: (a) an affidavit to Contractor's satisfaction that all payrolls, bills for materials and equipment, and other indebtedness connected with Subcontractor's Work have been paid; (b) consent of surety to final payment, if required by the Contractor; (c) satisfaction of required closeout procedures; and (d) the Subcontractor's providing of receipts, releases, and waivers of liens in such form as may be designated by Contractor or Owner. Final payment shall constitute a waiver of all claims by the Subcontractor relating to the Subcontractor's Work, but shall in no way relieve the Subcontractor of liability for either the indemnity or warranty obligations, or for faulty or defective work appearing before or after final payment. Provided however, that if the Owner assesses and retains against the Contractor any liquidated damages, all payments shall be reduced to the extent such assessment is attributable in whole or in part to the Subcontractor's fault and no claim involving such retention may be asserted by the Subcontractor until the assessment is first finally resolved with the Owner. Subcontractor's acceptance of final payment shall be held to be a final waiver of all claims of whatsoever nature against the Owner and the Contractor. To the extent permissible by the laws of the State where the Project is located, all payments, including final payment, shall be out of such equivalent payments received by the Contractor from the Owner. The receipt of such payments by the Contractor shall be a condition precedent to payment to the Subcontractor.

6. Prior to the first application for payment, the Subcontractor shall submit for approval a detailed schedule of values on AIA Form G703 or equivalent. The schedule of values must be broken down by the various aspects and areas of Work and include labor and material breakdowns for each work item, general conditions, mobilization, demobilization, punch list and administrative close out. Application for payments will not be processed until the schedule of values has been approved by the Contractor.

7. No payment received by the Subcontractor shall be used to satisfy or secure any indebtedness other than one owed by Subcontractor to a person or entity furnishing labor or materials for use in performing the Subcontractor's Work under this Agreement.

P. PAYROLL REPORTS.

1. When required by the Main Contract or the Contractor, the Subcontractor shall submit to the Contractor weekly certified payrolls in compliance with applicable State or Federal Department of Labor Standards. Failure to comply with this requirement will result in the delay or denial of payment of the Subcontractor's invoices. Subcontractor fully indemnifies and defends Contractor against any and all claims that Subcontractor failed to pay wages or benefits as provided under this Agreement or as required by law.

Q. CHANGES AND EXTRA WORK.

1. No extra or additional work shall be done by the Subcontractor except upon the prior express written authority of the Contractor and in the event the Subcontractor proceeds without such written authority, the Subcontractor thereby expressly waives any and all claims for additional payment therefore. No oral waiver of the requirements of prior written authority shall be binding.

2. Any increased price payable to the Subcontractor by virtue of such change shall not become due until a Change Order has been issued by the Contractor and the Contractor receives payment for that Change Order from the Owner.

3. The Contractor may, without invalidating this Agreement, make any changes by altering, adding to, or reducing the extent of the Work, including the deletion of any major items of work to be completed under the terms of this Agreement. Except as provided below, no change in the extent or scope of such Work shall be made except by a Change Order signed by the Contractor. The charge of credit for any such changes shall be determined, at Contractor's option, by any of the following methods: (1) agreed upon lump sum price, (2) unit prices named in this Agreement or subsequently agreed upon in writing, or (3) time and material. Subcontractor shall submit for approval a quotation covering any change made in the Work which affects the Contract Sum. Said quotation shall be submitted promptly upon receipt of notification of the change. The Contract Sum may be adjusted by Contractor by written Change Order or directive issued by Contractor, with or without consent of the Subcontractor, for backcharges and adjustments to the Contract Sum permitted under this Agreement.

4. With the exception of backcharges, all Change Orders must be approved and signed either by the Contractor's representative who executed this Agreement or another representative on the same level of authority. No changes to the Agreement, other than backcharges, may be made or agreed to by any personnel in the field. No field representatives have actual or apparent authority to agree to or approve changes to the Agreement.

R. PROGRESS.

1. Time is of the essence. To ensure completion of the Work under the Main Contract within the time stipulated therefore by the Main Contract, the parties hereto agree that the Work of the Subcontractor must be completed on or prior to the dates mutually set by both parties for the Subcontractor's Work on the approved progress schedule and the Subcontractor will maintain the specified rate of progress as it pertains to the Subcontractor's Work. The Subcontractor shall be subject to liquidated or other damages on the basis expressed in the Main Contract if the Subcontractor is the cause or contributor, in whole or in part, of any sole or concurrent delays which would allow the Owner to assess liquidated or other damages against the Contractor for late completion.

2. Should the Subcontractor in any way cause, in whole or in part, any delay in the progress of the Work due to its own fault or negligence so as to cause any loss or damage for which the Contractor suffers or shall become liable, whether or not liquidated damages are specified, the Subcontractor shall compensate the Contractor therefore. If the Subcontractor delays the progress of the Work, the Subcontractor shall, at its own cost and expense, work such overtime or provide additional resources as may be necessary or as directed by Contractor to avoid delay in the completion of the Work under this Agreement. Subcontractor further acknowledges that as construction progresses it may be necessary for Contractor to change the sequential order and duration of the various activities, including those contemplated by this Agreement to account for unanticipated delays, occurrences and other factors which act to alter Contractor's original schedule. Contractor may require Subcontractor, at no additional cost to Contractor, to prosecute Subcontractor's Work in such sequence as the progress of other trade contractors and the Project schedule reasonably dictates. It is expressly understood and agreed that the scheduling and sequencing of the Work is an exclusive right of Contractor and that Contractor reserves such right to reschedule and re-sequence Subcontractor's Work from time to time as the demands of the Project require without any additional cost or expense to be paid to Subcontractor.

3. If Subcontractor shall (a) fail to correct, replace and/or re execute faulty or defective Work and/or materials, (b) fail to complete

or diligently proceed with this Agreement within the time herein provided, or (c) be unable to proceed with the Work because of any action by one or more employees of Subcontractor or by a person or labor organization purporting or attempting to represent any employee of the Subcontractor; the Contractor, upon forty-eight (48) hours' notice to Subcontractor, shall have the right to correct, replace and/or re execute such faulty, defective or damaged work, or to take over this Agreement with all materials, tools and appliances of the Subcontractor on the premises and complete the remaining Work, charging the cost thereof to Subcontractor. Under such circumstances, the Contractor shall also have the right to withhold any and all payments to the Subcontractor until all such cost charges have been paid in full to the Contractor.

4. If delayed, the Subcontractor shall immediately notify the Contractor in writing. For claims solely against the Contractor, the Subcontractor shall give the Contractor written notice of all claims no later than five (5) days following the beginning of the event for which claim is made; otherwise, such claims shall be waived.

5. If the progress of the Subcontractor's Work is substantially delayed without the fault or responsibility of the Subcontractor, then the time for the Subcontractor's Work shall be extended by Change Order to the extent obtained by the Contractor under the Contract Documents, and the Schedule of Work shall be revised accordingly. The Contractor shall not be liable to the Subcontractor for any damages or additional compensation as a consequence of delays caused by any person not a party to this Agreement unless the Contractor has first recovered the same on behalf of the Subcontractor from said person, it being understood and agreed by the Subcontractor that the Subcontractor's sole and exclusive remedy for delay shall be an extension in the time for performance of the Subcontractor's Work.

6. Notice of any claim for extra cost or an extension of time by the Subcontractor shall be provided to Contractor no later than three (3) business days prior to the time the Contractor is required to make such claims to the Owner under the Contract Documents. The failure to timely submit claims to the Contractor will constitute a waiver of such claims.

S. DISPUTES.

1. Except as otherwise specifically provided in the Main Contract, any dispute concerning a question of fact arising under this Agreement which involves the Subcontractor and the Owner, which is not disposed of by agreement, shall be decided by the Contractor and/or the Owner's design professional, whose decision, when rendered in writing, shall be final and conclusive. Pending such final decision, the Subcontractor shall diligently proceed with the performance of this Agreement as directed by the Contractor. Should the Subcontractor disagree with the decision of the Contractor and/or the Owner's contracting authority in the disputed matter, the Contractor will bring a claim or appeal on behalf of the Subcontractor when timely requested, in writing, to do so by the Subcontractor. Any cost or expense in connection with such claim or appeal shall be at the sole expense of the Subcontractor.

2. On matters of dispute or disagreement between the Subcontractor and the Contractor, the Subcontractor will give the Contractor timely notice so that the Contractor can give such notices, perform such acts and furnish such information as may be required to resolve the dispute or disagreement. Pending the resolution of such dispute or disagreement, the Subcontractor, without any waiver of its other rights and remedies, agrees not to discontinue work and will diligently proceed with the performance of this Agreement. Any controversy or claim arising out of or related to any provision of this Agreement, or the breach thereof, not disposed of by agreement between the parties shall be subject to a settlement in accordance with the laws of the State where the Project is located. Whether the Main Contract specifically provide for, or is silent thereon, arbitration shall only be used to resolve disputes, if mutually accepted by both the Contractor and the Subcontractor.

3. All disputes arising out of, or relating to, this Agreement or the breach thereof, except for claims which have been waived by the making or acceptance of final payment, shall be resolved in the following order: (1) by a meeting of the project management on site. If that fails, (2) by a meeting of the principals in charge for each respective company. If that fails, (3) by mediation where the parties select a mediator, the costs of which shall be shared equally. All disputes and claims that are not disposed of as provided herein shall be resolved by submission to the courts located in the County where the Project is located. The parties further agree that the County where the Project is located, or such venue including said county, is the proper and exclusive venue for any litigation

and that any resort to litigation may only be brought in said county. Due to the specialized nature of construction litigation, each party hereby waives the right to a trial by jury. The parties acknowledge that they had the opportunity to seek the advice of their independent legal counsel before waiving their rights to a trial by jury. Subcontractor consents to personal jurisdiction in any State or Federal Court lying in or whose jurisdiction includes the County where the Project is located.

T. CLAIMS.

1. Should the Subcontractor claim any additional losses, costs, damages and expenses, by reason of any act, failure to act, default or interference by the Owner, the Subcontractor will carefully observe all terms and conditions of the Main Contract with reference thereto and will give the Contractor timely notice so that it can give such notices, perform such acts and furnish such information to the Owner as may be required by the Main Contract. The Subcontractor agrees that it will look solely for payment of any sums claimed to be due it, to moneys actually received by the Contractor from the Owner, based on such claims.

2. Subcontractor agrees to make any claim for extra work, extension of time, or for damages for delay or otherwise as authorized herein in the same manner and according to the same requirements as provided in the Main Contract and in such time as will enable the Contractor to promptly and timely submit such claims to the Owner for payment or recognition, and the Contractor shall not be liable to Subcontractor on any claim not timely or properly presented. Any claim involving compensation to be paid to Subcontractor must be submitted no later than three (3) business days prior to the time the Contractor is required to make such claims to the Owner under the Contract Documents. Strict compliance is an absolute condition precedent to any Subcontractor claim.

3. In the event the Subcontractor's performance is delayed or interfered with by acts of the Owner, the Contractor or other subcontractors, Subcontractor may request an extension of time for performance as hereinafter provided, but shall not be entitled to any increase in the Contract Sum or any additional compensation or consequential damages as a result of such delays or interference except to the extent that the Main Contract entitle the Contractor to compensation from the Owner for such delays and then only that amount which the Contractor shall actually recover from the Owner on behalf of the Subcontractor for such delays. The extension of time, if requested, shall, in the absence of a provision in the Main Contract to the contrary, be the sole and exclusive remedy afforded Subcontractor for any schedule related claim.

4. The parties hereby agree that any damages relating to any claims made under this Agreement must be quantifiable and made with a reasonable degree of certainty. Further, the parties agree that the total cost method or total cost approaches of calculating damages are inherently unreliable and uncertain. Therefore, the parties waive any damages based on the total cost method or total cost approach or any variations or modifications of the total cost approach.

5. This Agreement is a lump sum contract and does not contemplate any changes in the Contract Sum due to weather and/or material and/or labor escalations whether in quantity or price. The Subcontractor represents and warrants that it has by its own independent investigation ascertained the quantity and price of the Scope of Work. The Subcontractor waives any claims based on material escalations for price and quantity.

6. Subcontractor agrees that recovery of damages resulting from any other act or failure to act by the Owner shall be limited to the amount of damages recovered by the Contractor from the Owner on the Subcontractor's behalf. Subcontractor shall make all claims for which the Owner is or may be liable to the Contractor in the manner and form prescribed by the Contract Documents. If Contractor pursues a recovery against the Owner on Subcontractor's behalf, Subcontractor shall be solely responsible for all attorneys' fees and other expenses incurred in pursuing such claim and shall reimburse Contractor on a monthly basis for all said fees and costs.

7. Contractor disclaims any and all warranties, express or implied, as to the accuracy or adequacy of the plans and/or specifications contained in the Contract Documents. Subcontractor shall make no claim based upon such disclaimed warranties.

U. DEFAULT AND TERMINATION.

1. Should the Subcontractor default in the performance of any of the requirements of this Agreement or of the Main Contract, applicable to its Work; or fail to provide a sufficient crew of workmen as and when required; or fail to properly prosecute its Work; or fail to maintain the progress of its Work; or abandon its; or interfere with the performance of others working on this Project; or fail to pay for labor employed on the Subcontractor's Work; or fail to pay its sub-contractors or suppliers; or fail to pay or to maintain satisfactory credit relationships for the purchase of supplies, materials, rental equipment, and services; or fail to pay contributions to labor welfare funds, state and Federal payroll taxes, and sales or use taxes; then such default, abandonment, interference or failure shall be considered a breach of this Agreement. In such event the Contractor, at its option, may terminate the Subcontractor's right to proceed by giving the Subcontractor forty-eight (48) hours' notice in writing commencing upon the deposit of the same in the United States mail; provided, however, that such notices be null and void if such default is cured, within the notice period, to the complete satisfaction of the Contractor. A determination by Contractor that Subcontractor is in default of any obligation under this Agreement or that Subcontractor has failed to properly cure any default will be binding and conclusive on Subcontractor.

2. Upon the expiration of the cure notice period, the Contractor shall be at liberty to immediately or subsequently terminate the employment of the Subcontractor on the said Work and to enter on the site of the Work and take possession, for the purpose of completing the Work included in this Agreement, of all material and equipment of the Subcontractor thereon, and to employ any other person or persons to finish the Work, and to provide materials therefore. The Subcontractor hereby assigns, transfers and sets over unto the Contractor all of the said equipment and/or materials. In case of such discontinuance of the employment of the Subcontractor, the said Subcontractor shall not be entitled to receive any further payment under this Agreement until the said Work shall be wholly finished, at which time, if the unpaid balance of the amount to be paid under the Agreement shall exceed the expense incurred by the Contractor in finishing the said Work, such excess shall be paid by the Contractor to the Subcontractor, but if such expense shall exceed such unpaid balance, then the Subcontractor shall pay the difference to the Contractor. The expense incurred by the Contractor shall include the cost of furnishing labor, materials and/or subcontracting the finishing of the Work. All expenses incurred by Contractor in performing Subcontractor's Work upon default or termination, including reasonable overhead, profit and attorney's fees, shall be deducted from any monies due or to become due to Subcontractor. The Subcontractor and its sureties shall remain liable to the Contractor for any damages, expenses, legal fees, and liquidated or other damages suffered by the Contractor resulting from the Subcontractor's default without waiver of or prejudice to any other right, remedy or claim the Contractor may have in the premises. If it is determined, by litigation, arbitration or otherwise, that termination for default was unjustified for any reason, the termination shall be deemed a termination for convenience and Subcontractor's remedies shall be limited to those provided for as a termination for convenience.

3. This Subcontract may be terminated for convenience for any reason provided for under the Agreement between Contractor and Owner, or, within the sole and exclusive discretion of Contractor. The Subcontractor shall notify the Contractor in writing within two (2) days after receipt of the Contractor's order of the impact on Subcontractor's Work. No claim under this Section shall be allowed unless the notice is provided herein. In the event of a Termination for Convenience, Contractor shall only be obligated to pay Subcontractor, as otherwise provided for and in accordance with the other terms of this Subcontract, and as Subcontractor's sole and exclusive remedy: (1) that portion of the cost of the Work allocable to the portion of the Project performed by Subcontractor prior to the effective date of termination; plus (2) such other costs, upon presentation of proof acceptable to Contractor, which Subcontractor reasonably may incur as a result of such termination (including demobilization, forfeited deposits, redeployment costs, applicable Project related rents, or cancellation charges); plus (3) Subcontractor's Overhead & Profit applied to the costs determined under (1) and (2); plus (4) retainage (if any) being held by Owner. Under no circumstances shall Subcontractor be entitled to recover for profit on work not performed prior to the notice of termination for convenience.

V. INDEMNIFICATION AND DEFENSE.

1. **THE SUBCONTRACTOR SHALL FULLY AND COMPLETELY INDEMNIFY, DEFEND AND FOREVER HOLD**

CONTRACTOR, OWNER AND ARCHITECT/ENGINEER HARMLESS, ALONG WITH ALL OF THEIR OFFICERS, DIRECTORS, EMPLOYEES, AGENTS AND ASSIGNS, FROM AND AGAINST ANY AND ALL CLAIMS AND/OR LIABILITIES OF ANY TYPE OR KIND, REGARDLESS OF THE LEGAL THEORY, INCLUDING BUT NOT LIMITED TO: (1) ANY AND ALL CLAIMS FOR PERSONAL INJURY OR PROPERTY DAMAGE, (2) ANY AND ALL CLAIMS RELATING TO PERFORMANCE OR THE FAILURE TO PERFORM THIS AGREEMENT, (3) ANY AND ALL CLAIMS ARISING OUT OF SUBCONTRACTOR'S USE OF CONTRACTOR'S EQUIPMENT AS DESCRIBED IN SECTION L-2 OF THIS AGREEMENT, (4) ANY AND ALL CLAIMS ARISING OUT OF INTELLECTUAL PROPERTY RIGHTS, SUCH AS COPYRIGHT, TRADEMARK AND PATENT INFRINGEMENT CLAIMS, AND/OR (5) ANY AND ALL OTHER CLAIMS WHICH MAY ARISE OUT OF OR BE RELATED DIRECTLY OR INDIRECTLY TO THIS AGREEMENT. THIS INDEMNITY OBLIGATION COVERS ALL CLAIMS OF ANY TYPE OR KIND CAUSED BY OR CONTRIBUTED TO, IN WHOLE OR IN PART, ANY ACTIVITY OR INACTIVITY OF SUBCONTRACTOR, OR ITS SUB-SUBCONTRACTORS, SUPPLIERS, AGENTS, OFFICERS, DIRECTORS OR EMPLOYEES. THIS INDEMNITY APPLIES TO ALL CLAIMS REGARDLESS OF ANY ACTIVE OR PASSIVE NEGLIGENCE ON BEHALF OF THE INDEMNIFIED PARTIES. THIS INDEMNITY DOES NOT COVER CLAIMS ARISING OUT OF THE SOLE NEGLIGENCE OF ONE OF THE INDEMNIFIED PARTIES, NOR DOES IT COVER CLAIMS AGAINST THE ARCHITECT OR ENGINEER FOR PROFESSIONAL MALPRACTICE. ALL OTHER CLAIMS UNDER THIS INDEMNITY ARE COVERED, INCLUDING CLAIMS ARISING BEFORE, DURING AND/OR AFTER THE PROJECT WAS COMPLETED. THIS INDEMNITY APPLIES TO ALL ASPECTS OF THIS AGREEMENT. THE INDEMNIFICATION OBLIGATIONS HEREIN SHALL NOT BE LIMITED IN ANY WAY BY ANY LIMITATION ON THE AMOUNT OR TYPE OF DAMAGES, COMPENSATION OR BENEFITS PAYABLE BY OR FOR THE SUBCONTRACTOR UNDER WORKER'S COMPENSATION ACTS, DISABILITY BENEFIT ACTS OR OTHER EMPLOYEE BENEFIT ACTS.

2. The Subcontractor expressly agrees and understands that the Subcontractor shall provide a defense for the Owner, Architect and/or Engineer and the Contractor in any lawsuit, administrative hearing, arbitration or similar proceeding covered by this indemnification. The obligation to provide a defense shall accrue immediately upon receipt of notice of said legal proceedings from any defendant indemnified herein. If the Subcontractor fails to provide timely, competent and successful defense, the Contractor shall be entitled to any and all costs associated with said defense; including but not limited to attorney fees and ancillary costs incurred to enforce this indemnity and defense provision.

3. Furthermore, the Subcontractor will advise its insurer and surety of these indemnifications, hold harmless, release and defense obligations and will obtain contractual coverage endorsement to discharge his obligations as set forth herein.

4. For all claims against the Owner, the Architect, the Contractor, or any of their affiliates, agents, parents or subsidiaries, and other contractors or subcontractors on the Project, or any of their agents or employees, by any employee of the Subcontractor, or anyone directly or indirectly employed by the Subcontractor, or anyone for whose acts the Subcontractor may be liable, the indemnification obligation in this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Subcontractor under worker's compensation acts, disability benefit acts or other similar employee benefit acts. The Subcontractor shall comply with all federal, state and local laws, ordinances and regulations (hereinafter collectively referred to as "laws") applicable to the Subcontractor's Work including but not limited to, equal employment opportunity, minority business enterprise, and women's business enterprise, disadvantaged business enterprise, Immigration Control and Relief Act of 1986 and any State statutes pertaining thereto, safety and all other laws with which the Contractor must comply according to the Contract Documents. The Subcontractor shall be liable to Contractor for all loss, cost and expense attributable to any acts or failure to act by the Subcontractor, its employees and agents resulting from the failure to comply with any laws, including, but not limited to, any fines, penalties or corrective measures.

5. Subcontractor shall pay all royalties and license fees which may be due for the use of any patented materials in the Subcontractor's Work and shall indemnify, defend and be liable to the Contractor for all loss, including costs, expenses, and attorney's fees associated with the failure to do so.

6. The parties agree that $100 of the contract price is part of the consideration for this indemnity obligation. Only in those states where there must be a contractual limit on indemnity obligations, said contractual limit shall be three times the value of the aggregate Comprehensive General Liability insurance limits as required by this Agreement.

W. ENFORCEMENT.

1. The failure of the Contractor to enforce, at any time, any of the provisions of this Agreement, or to require at any time, performance by the Subcontractor of any of the provisions hereof, shall be in no way construed to be a waiver, nor in any way to affect the validity of this Agreement order or any part thereof or the right of the Contractor to thereafter enforce each and every such provision.

2. Should any portion of this Agreement be invalid or unenforceable, the remainder of the Agreement shall be valid and enforceable to the fullest extent permitted by law.

X. WARRANTY.

1. The Subcontractor warrants that the Work herein contracted will be as specified and will be free from defects in design, workmanship, and materials. If within the warranty period the Work fails to meet the provisions of this warranty, the Subcontractor shall promptly correct any defects, including nonconformance with the Contract Documents, by adjustment, repair, or replacement of all defective parts or materials. Subcontractor shall pay all costs associated with accessing its work to make warranty repairs and returning Subcontractor's Work, as well as all surrounding work affected during the warranty repair into the condition required by the Contract Documents. If Contractor determines that Subcontractor is not timely completing its warranty obligation, Contractor may make those repairs and backcharge Subcontractor all the costs associated with the repairs. If no sums remain due Subcontractor, Subcontractor shall pay Contractor all those costs immediately upon demand.

2. The Subcontractor shall provide a one (1) year warranty from the actual Project "Substantial Completion Date" on all material, equipment and workmanship unless a longer warranty period is required as specified in the specifications. With respect to any portion of the goods or services which have been repaired or replaced by Subcontractor during the warranty period, the Subcontractor shall provide a one (1) year warranty on the goods or services after the date of repair or replacement.

ARTICLE VI - MISCELLANEOUS PROVISIONS

A. ADDITIONAL SUBCONTRACTOR RESPONSIBILITIES.

1. Subcontractor shall be solely responsible for layout of its Work. Subcontractor shall be solely responsible for the accuracy and workmanship of its Work and shall be solely responsible to others for its failure to perform in accordance with the Contract Documents.

2. Subcontractor's Work shall be executed in strict accordance with the Contract Documents and in the most sound and workmanlike manner. All workmanship shall be of the highest grade, and all materials used in the Subcontractor's Work shall be furnished in sufficient quantities to properly and expeditiously perform and complete the Work, and all materials and equipment furnished shall be new except as provided in the Contract Documents.

3. Subcontractor shall not perform any work directly for the Owner or any tenants thereof, or deal directly with the Owner's representatives in connection with the Project.

4. If Subcontractor's Work includes installation of materials or equipment furnished by others, Subcontractor shall examine the

items with due care and install the items with such skill and care as to ensure a satisfactory and proper installation.

5. Subcontractor shall only utilize labor which will not cause labor disputes in the performance of Work by Subcontractor, Contractor or any other party employed at the Project. In the event Subcontractor's workers are involved in a dispute with other crafts on the Project, or any union, or such workers refuse work due to any labor disputes, Subcontractor shall immediately resolve such disputes. Failure to do so shall be a material breach of this Agreement.

B. NATURE OF RELATIONSHIP.

1. For all purposes herein, the Subcontractor shall be deemed to be an independent contractor fully responsible for the means, methods and safety measures and procedures utilized fulfilling the scope of services or terms of this Agreement.

Under no circumstances shall the Subcontractor be deemed to be an employee or joint venturer with the Contractor.

C. SEVERABILITY.

1. Any provision of this Agreement may be severable from the whole without affecting the enforceability of the remainder if so deemed by a court of competent jurisdiction.

D. NO WAIVER.

1. Any failure of either party to enforce any of the provisions of this Agreement or to require compliance with any of its terms at any time during the duration of this Agreement shall in no way effect the validity of this Agreement, or any part hereof, and shall not be deemed a waiver of such party thereafter to enforce any and each such provision.

E. SUCCESSORS AND ASSIGNS.

1. This Agreement shall be binding upon the parties hereto and their successors and assigns.

F. EXHIBITS.

1. The following exhibits attached hereto are included herein by reference.

a. Exhibit I Supplement "A"

b. Exhibit II Contractor's Safety Program

G. CALENDAR DAYS.

1. All references in this Agreement to days, or requirements that action be taken or notice be provided within a certain number of days, are to calendar days.

SAMPLE

ACCEPTANCE

The said parties, for themselves, their heirs, successors, executors, and administrators and assignees, do hereby agree to the full performance and covenants contained herein.

By signing below these parties affirm that they are each authorized agents of their respective organizations, with full rights and privileges to enter into this Agreement on behalf of those respective organizations. This Agreement may be executed by facsimile signature, or a copy of a signed Agreement may be delivered via email by either party and such signature will be deemed binding for all purposes hereof without delivery of an original signature being thereafter required.

Signature	Signature
Print Name	Print Name
Title	Title
Date	Date
Witnessed By: Print Name	Witnessed By: Print Name
Signature	Signature

SAMPLE

RENTENBACH

A CHRISTMAN COMPANY

Trade Contractor Guarantee

Project: _____

Job No.: _____

Owner: _____

A/E: _____

Date: _____

Trade Contractor: (company)
(address)
(city, state)

Work Category No.: (wc) (wcdescription)

We, the undersigned, hereby guarantee that all work accomplished and materials provided under the above-named contract or subcontract is in accordance with the terms of the contract documents as prepared by The Christman Company and the Architect/Engineer, including all addenda, change orders, and clarifications issued.

All work under the above-named contract or subcontract shall be guaranteed against defective material and workmanship for a period of **one (1)** year after **(appropriate date)**; correction of any deficiencies or defective work developing during this period shall be undertaken within three (3) working days following the receipt of notice by Rentenbach Constructors Inc. or Owner; and such work shall be made good by this trade contractor or sub-trade contractor at his own expense.

The following extended guarantees are a part of this contract or subcontract and shall be guaranteed as specifically described in the contract documents and as follows, but not limited to:

Trade Contractor: _____

By: _____

Signature: _____

Address: _____

_____

Telephone: _____

Fax: _____

AUTHORIZATION AGREEMENT
FOR
AUTOMATIC DEPOSITS
(ACH Credits)
FORM

REFERENCES

A. Refer to paragraph 17.1 of Instructions to Bidders.

B. Refer to paragraph 9.11 of the Conditions of the Contract.

FORM

Use the "Authorization Agreement for Automatic Deposits (ACH Credits) Form" which will be provided by the Owner at the time of presentation of the Agreement form for signing. A copy of this form is provided immediately following this page for information purposes only.

COMPLETION OF FORM

A. Fill out the form in its entirety:

B. Inquiries regarding completion of the form should be made to:

State of Tennessee, Department of Finance and Administration
Office of Business and Finance (615) 741 - 2590

STATE OF TENNESSEE
DEPARTMENT OF FINANCE AND ADMINISTRATION

ACH (AUTOMATED CLEARING HOUSE) CREDITS (Not Wire Transfers)

NAME _____

Federal Identification Number or Social Security Number _____
(under which you are doing business with the State.)

I (We) hereby authorize the State of Tennessee, hereafter called the STATE, to initiate credit entries to my (our) (*select type of account*) _____ CHECKING or _____ SAVINGS account indicated below and the depository named below, hereinafter called DEPOSITORY, to credit the same to such account.

This authority is to remain in full force and effect until the STATE has received written notification from me (or either of us) of its termination in such time and in such manner as to afford the STATE and DEPOSITORY a reasonable opportunity to act on it.

****

Do you currently receive payments from the State through ACH?_____ (Yes or No). If yes, do you intend for this account information to replace other existing account information currently used by the State?_____ (Yes or No). If yes, please specify the account that should be changed: ABA No._____ Account No._____.
Is this authorization only for certain types of payments?_____ (Yes or No). If yes, please indicate types:

_____

_____

_____

****

Many banking institutions use different numbers for ACH. Please call your bank for verification of ACH transit and account number.

Bank official contacted: _____ Phone No. _____

****

DEPOSITORY/BANK NAME _____ BRANCH _____

CITY _____ STATE _____

ACH TRANSIT/ABA NO. _____ ACCOUNT NO. _____

NAME(S) _____
(Please print names of authorized account signatory)

DATE _____ SIGNED X _____ SIGNED X _____

PLEASE ATTACH A VOIDED CHECK (OR FOR SAVINGS ACCOUNTS, A DEPOSIT SLIP):

PLEASE INDICATE ADDRESS TO WHICH YOU WOULD LIKE YOUR REMITTANCE ADVICES ROUTED WHEN PAYMENTS ARE PROCESSED:

_____

_____

_____

_____

Contact name: _____

Telephone no.: _____

FA-0825
(Rev. 4/96)

00 54 33

SUBSTITUTE W-9 FORM

REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND CERTIFICATION

1. Complete general information:

Taxpayer Name _____ Phone Number _____

Business Name (if applicable) _____

Address _____

City _____ State _____ ZIP Code _____

2. Circle the most appropriate category below: (circle only one)

1) Individual (not an actual business.)
2) Joint account (two or more individuals.)
3) Custodian account of a minor.
4) a) Revocable savings trust (grantor is also trustee.)
   b) So-called trust account that is not a legal or valid trust under state law.
5) Sole proprietorship (using a social security number for the taxpayer ID.)
6) Sole proprietorship (using a federal employer identification number for taxpayer ID.)
7) A valid trust, estate, or pension trust.
8) Corporation.
9) Association, club, religious, charitable, educational, or other not-profit organization (for entities that are exempt from federal tax, use category 13 below).
10) Partnership.
11) A broker or registered nominee.
12) Account with the U.S. Department of Agriculture in the name of a public entity that receives agricultural program payments.
13) Government agencies and organizations that are tax-exempt under Internal Revenue Service guidelines (i.e., IRC 50(c)3 entities).

3. Fill in your taxpayer identification number below: (complete only one)

1) If you circled number 1 - 5 above, fill in your Social Security Number:

   ☐☐☐ - ☐☐ - ☐☐☐☐

2) If you circled number 6 - 13 above, fill in your Federal Employer Identification Number (EIN):

   ☐☐ - ☐☐☐☐☐☐☐

4. Sign and date the form:

Certification – Under penalties of perjury, I certify that the number shown on this form is my correct taxpayer identification number. If I circled category 13 above, I also certify that my agency or organization is tax-exempt per Internal Revenue Service guidelines and not subject to backup withholding.

Signature _____ Date _____

Print Name _____ Title _____

00 54 35

SECTION 00 54 43
RETAINAGE ESCROW INITIATION

PART 1 - GENERAL

1.01 Basic Requirements

A. Retainage escrow requirements are mandated by Chapter No. 340 House Bill No. 966 Public Acts of 1985 which was passed by the Tennessee General Assembly.

B. Conditions of Contract, in accordance with State law, require retainage to be deposited into an interest- bearing escrow account if the Contract Sum Five Hundred Thousand and no/100ths Dollars ($500,000) or greater. Compliance is mandatory and cannot be waived.

C. Failure to have the escrow account operational by the time of the contractor's second application for payment can result in delay of payment or inability of the Owner to make payment. Any such delay or inability to pay will not be grounds for relief under the prompt payment statutes.

1.02 The banking institution handling the retainage escrow account must be in an appropriate custodial care agreement with the State Treasurer. If not already in such an agreement, a banking institution can request such an agreement from the State Treasurer, subject to meeting eligibility requirements of TCA section 12-4-108(c).

1.03 Getting Started

A. Shortly after award of Contract, the Tennessee Department of Finance and Administration (F&A) will send the Contractor the latest information for starting the account. This information typically includes:

1. Procedural guide,
2. Forms, including the basic application, colloquially referred to as "Form A", and
3. List of banks that currently have agreements with the State to host retainage escrow accounts.

B. Getting help

1. The instructions from F&A will include a name and phone number to call for help:

a. If the Contractor needs help completing Form A, and
b. If the Contractor plans to use a lending institution that does not have a current agreement with the State for hosting retainage escrow.

2. At the time this standard specification is written (see bottom left of page) the contact person for help in setting up new escrow accounts and completing Form A is Mary Mansour at (615)741-1317.

C. To avoid delays in setting up the escrow, and possible delays in payment, do not wait to be contacted by F&A as described above. Instead, if the Contract Sum is Five Hundred Thousand and no/100ths Dollars ($500,000) or greater, upon award of the Contract, please have the escrow bank complete, execute, and send the original wet-signature Form A to:

ATTN: Mary Mansour
Tennessee Department of Finance and Administration
Office of Business and Finance
Suite 2000 William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue
Nashville TN 37243-0294

1.04 A sample of Form A is provided on page 2 of this Section.

FORM A

APPLICATION FOR THE SUBSTITUTION OF SECURITIES FOR ALL AMOUNTS RETAINED ON STATE BUILDING COMMISSION CONSTRUCTION CONTRACTS

Date: _____

RE: Contract Number: _____
Project No.: _____
Location: _____

Dear State Building Commission:

Pursuant to the provisions of Tennessee Code Annotated, Sections 12-4-108,

Contractor's name and address as appearing on construction Contract:	

hereby requests that whenever payment for which certain amounts are retained by the State Building Commission as determined by the subject construction contract, the amount so retained be substituted for approved securities, as designated by the Tennessee State Treasurer.

The undersigned Contractor hereby appoints _____
(Name of Banking Institution)

located at _____ to be its
(Complete Address of Banking Institution)

agent and attorney-in-fact to receive all amounts retained by the State Building Commission under the provisions of the subject construction Contract and to purchase Retainage Securities of the following type:
(Description)

The appointed Banking Institution, as indicated by the acceptance signature shown below, agrees to enter or has already entered into a Trust Agreement with the Tennessee State Treasurer to act as custodian and servicing agent of Retainage Securities and to perform all assigned duties and responsibilities with respect thereto as set forth in the Trust Agreement, which is herein incorporated by reference.

Very truly yours,

_____ _____
(Signature of Authorized Representative of Contractor) *(Title)*

ACCEPTED:

_____ _____
(Signature of Authorized Officer of Banking Institution) *(Title)*

CONTACT PERSON (BANK) _____
PLEASE PRINT

PHONE NUMBER _____

END OF SECTION

00 55 00 – Subcontractor Insurance Requirements

See Subcontract Agreement 00 52 23.10 for specifics regarding insurance requirements. A basic summary of coverages is provided below for convenience.

a. Worker's Compensation - Statutory Limits

- $500,000 Employer's Liability

b. Commercial General Liability

1) Bodily Injury - $2,000,000 Each Occurrence

- $2,000,000 Aggregate

2) Property Damage - $2,000,000 Each Occurrence

- $2,000,000 Aggregate

c. Comprehensive Automobile Liability

1) Bodily Injury - $2,000,000 Each Occurrence

- $2,000,000 Aggregate

2) Property Damage - $2,000,000 Each Occurrence

CONTRACT BOND

TENNESSEE STATE BUILDING COMMISSION STANDARD FORM

BOND NO. _____

Know all men by these presents: that we

(hereinafter called the "Principal") and

hereinafter called the "Surety") do hereby acknowledge ourselves indebted and securely bound and held unto

(hereinafter called the "Owner"), and in the penal sum of

good and lawful money of the United States of America, for the use and benefit of those entitled thereto, for the payment of which, well and truly to be made, we bind ourselves, our heirs, our administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

But the condition of the foregoing obligation or bond is this:

Whereas, the Owner has engaged the principal for the sum of

to complete the Work of the project titled:

as more fully appears in a written agreement or contract bearing the date of

a copy of which said agreement or contract is by reference hereby made a part hereof, as fully and to the same extent as if copied at length herein, and it is the desire of the Owner that the Principal shall assure all undertakings under said agreement or contract and shall assure and protect all laborers and furnishers of material on said Work both as provided by Tennessee Code Annotated Sections 4-15-102 (f)(2) and 12-4-201 through 12-4-206, and any and all amendments thereto, and shall assure the prompt payment of claims as provided by Tennessee Code Annotated Sections 12-4-207 through 12-4-208, and any and all amendments thereto. The Principal shall also comply with provisions of Tennessee Code Annotated Sections 12-4-401 through 12-4-415, and any and all amendments thereto, pertaining to the payment of the prevailing wage rate.

Now, therefore, if the Principal shall fully and faithfully perform all undertakings and obligations under the contract hereinbefore referred to and shall fully indemnify and hold harmless the Owner from all costs and damage whatsoever which it may suffer by reason of any failure on the part of the Principal to do so, and shall fully reimburse and repay the Owner any and all outlay and expense which it may incur in making good any such default, and shall fully pay for all of the labor, material and work used by the Principal and any immediate or remote sub-contractor or furnisher of material under him in the performance of said contract, in lawful money of the United States, as the same shall become due, then this obligation or bond shall be null and void, otherwise to remain in full force and effect.

And for value received, it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or to the specifications accompanying the same shall in any wise affect the obligation under this bond, and notice is hereby waived of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the specifications.

In witness whereof the Principal has hereunto affixed its signature and Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 20____.

Executed in _____ counterparts.

Witness:

_____	_____
(name of Principal)	*(name of Surety)*
_____	_____
(authorized signature)	*(signature of Attorney-in-fact)*
_____	_____
(name of signatory)	*(name of Attorney-in-fact)*
_____	_____
(title of signatory)	*(Tennessee license number of Agent or Attorney-in-fact)*
	_____
	(countersignature of resident Agent if not same as Attorney-in-fact)

Surety Company issuing bond shall be licensed to transact business in State of Tennessee by Tennessee Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety's Attorney-in-Fact attached. Attorney-in-fact who executes bond on behalf of Surety shall be licensed by and a resident of State of Tennessee, and shall affix license number to bond; or, countersignature by a licensed agent who is a resident of State of Tennessee, and the agent's license number, shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.

THREE-YEAR ROOF BOND

TENNESSEE STATE BUILDING COMMISSION STANDARD FORM

BOND NO. _____

GENERAL INFORMATION:

Principal: _____

Surety Name: _____

& Address: _____

_____

Building Owner: State of Tennessee

Project: _____

_____

_____

Project Contract Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That we, the Principal and the Surety, are held and firmly bound unto the Building Owner in the amount of

for the payment thereof in good and lawful money of the United States of America the Principal and the Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Whereas, Principal has, by written agreement referenced above, entered into a contract (hereinafter referred to as "the Contract" and hereby referenced herein) with the Owner for the construction of the Project identified above.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall fully indemnify the Owner for all loss that the Owner may suffer by reason of any defective material and/or workmanship in the materials furnished for and the installation of the above referenced Project roofing system which become apparent during the period of three (3) years from the date of Substantial Completion of the above referenced Project roofing system, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Surety hereby agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or to the specifications accompanying the same shall in any way affect the obligations under this bond, and notice is hereby waived of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the specifications.

IN WITNESS WHEREOF the Principal has hereunto affixed its signature and Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ____ day of _____, 20___.

Executed in _____ counterparts.

Witness:

_____	_____
(name of Principal)	*(name of Surety)*
_____	_____
(authorized signature)	*(signature of Attorney-in-fact)*
_____	_____
(name of signatory)	*(name of Attorney-in-fact)*
_____	_____
(title of signatory)	*(Tennessee license number of Agent or Attorney-in-fact)*
	_____
	(countersignature of resident Agent if not same as Attorney-in-fact)

Surety Company issuing bond shall be licensed to transact business in State of Tennessee by Tennessee Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety's Attorney-in-Fact attached. Attorney-in-fact who executes bond on behalf of Surety shall be licensed by and a resident of State of Tennessee, and shall affix license number to bond; or, countersignature by a licensed agent who is a resident of State of Tennessee, and the agent's license number, shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.

SECTION 00 65 01
NON-USE OF ASBESTOS CONTAINING MATERIALS AFFIDAVIT - CONTRACTOR

STATE OF TENNESSEE

COUNTY OF: _____

Project Name: _____

SBC Project No.: _____

By the signature below, the signatory for the Contractor certifies that neither he/she nor the firm, corporation, partnership or institution represented by the signatory or anyone acting for the firm providing Construction Services for this project, including Subcontractors, have utilized materials, procedures or processes that knowingly or intentionally contain asbestos materials.

Signature: _____ Printed Name: _____

Title: _____ Company: _____

Date: _____

State of Tennessee,
County of _____

Sworn to and subscribed before me on the _____ day of_____, 20___ by

_____ the undersigned authority on behalf of said Contractor.
(name/signature of signer)

_____ _____
Notary Public's Signature Printed Name

My commission expires: _____

(Personalized Seal)

AIA® Document A201™ – 1997

General Conditions of the Contract for Construction

for ~~the following PROJECT:~~
~~(Name and location or address):~~
all Tennessee Board of Regents General Work
OFD 00 72 23 CM/GC
December 2007

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

This document has been approved and endorsed by The Associated General Contractors of America

THE OWNER:
~~(Name and address):~~Tennessee Board of Regents

~~THE ARCHITECT:~~
~~(Name and address):~~
THE DESIGNER:
as identified in the agreement

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Written Consent
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, the Contractor's GMP Qualifications and Assumptions, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the ~~Architect.~~ Designer. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of Addenda relating to bidding requirements).

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the ~~Architect~~ Designer and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and ~~Architect~~ Designer or (4) between any persons or entities other than the Owner and Contractor. The ~~Architect~~ Designer shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the ~~Architect's~~ Designer's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work ~~may constitute the whole or a~~ constitutes part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 THE PROJECT MANUAL

The Project Manual is a volume or set assembled for the Work which may include the bidding requirements, sample forms, Conditions of the ~~Contract and Specifications.~~ Contract, schedules, tables, drawings, and Specifications.

§ 1.1.8 PROVIDE OR PROVIDED:

"Provide" or "Provided" as used in Contract Documents includes furnishing and install a thing, product, system or the like.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary and required of the Contractor to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 Within the Specifications, the sections of Division One (01) are General Requirements, and apply to all sections of the Specifications.

§ 1.3 CAPITALIZATION

§ 1.3.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

§ 1.4.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 EXECUTION OF CONTRACT DOCUMENTS

§ 1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the ~~Architect~~ Designer shall identify such unsigned Documents upon request.

§ 1.5.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 1.6

~~OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE~~OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

§ 1.6.1 The Drawings, Specifications and other documents, including those in electronic form, prepared by the ~~Architect~~ Designer and the ~~Architect's~~ Designer's consultants are ~~Instruments of Service~~ Documents through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the ~~Architect~~ Designer or the ~~Architect's~~ Designer's consultants, and unless otherwise indicated the ~~Architect~~ Designer and the ~~Architect's~~ Designer's consultants shall be deemed the authors of ~~them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service,~~ them. All copies of Documents, except the Contractor's record set, shall be returned or suitably accounted for to the ~~Architect,~~ Designer, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the ~~Architect~~ Designer and the ~~Architect's~~ Designer's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, ~~Architect~~ Designer and the ~~Architect's~~ Designer's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the ~~Architect~~ Designer and the ~~Architect's~~ Designer's consultants appropriate to and for use in the execution of their Work under the Contract Documents. ~~All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' copyrights or other reserved rights.~~

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ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the ~~Architect~~ Designer does not have such authority. The term "Owner" means the Owner or the Owner's authorized ~~representative.~~ representative in accordance with State Building Commission policy.

§ 2.1.2 ~~**The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.**~~ Public construction projects are not subject to mechanics' liens in Tennessee. The remedy afforded to laborers and furnishers of material on State projects is referenced in subparagraph 4.4.8.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 The ~~Owner shall, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~ Owner's project number constitutes verification that funding has been established as a matter of public record.

§ 2.2.2 Except for permits and fees, including those required under Section 3.7.1, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable ~~promptness.~~ promptness so as not to delay the progress of the Work. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

§ 2.4.1 If ~~the~~ Contractor defaults or neglects to carry out the Work in accordance with ~~the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a three-day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an~~

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~~appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.~~Contract Documents or fails to fulfill requirements of Contract, then Owner may after ten (10) days written notice to Contractor and without prejudice to any other remedy that Owner may have, make good such deficiencies.

§ 2.4.2 If the Contractor fails to complete the Work in accordance with the time limit stipulated in the Certificate of Substantial Completion, then Owner may take over the completion of Work without advance notice to Contractor and without prejudice to any other remedy that Owner may have.

§ 2.4.3 In such cases as described in 2.4.1 and 2.4.2,appropriate modification will be issued deducting from the Contract Sum payment then or thereafter due Contractor the cost of correcting such deficiencies or completing such Work, regardless of whether Owner actually undertakes completing such Work, in which case the deduction shall be based on the Designer's estimate in accordance with 7.3.6, including cost of Designer's additional services made necessary by such default, neglect, or failure. Designer will approve such action and the amount charged to Contractor. If neither the balance of the Contract Sum nor payments then or thereafter due Contractor, other than the Contractor's Contingency, are sufficient to cover such amount, Contractor shall pay difference to Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Construction Manager / General Contractor or the ~~Contractor's~~ its authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the ~~Architect~~ Designer in the ~~Architect's~~ Designer's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than ~~the Contractor.~~the Contractor except for such activities or duties assumed by the Owner under other Contracts.

§ 3.1.4 At the time of bid and award, Contractor shall not be currently disqualified from participating in State construction projects under the supervision of the State Building Commission. Such disqualification extends to succeeding or related corporations, partnerships, joint ventures, and other business organizations having substantial factual or legal connections, continuity, or identity with those that have been disqualified.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the ~~Architect~~ Designer as a request for information in such form as the ~~Architect~~ Designer may require.

§ 3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the ~~Architect,~~ Designer, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design ~~professional unless otherwise specifically provided in the Contract Documents.~~ professional. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the ~~Architect.~~Designer.

§ 3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the ~~Architect~~ Designer in response to the Contractor's notices or requests for information pursuant to

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Sections 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Sections 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Sections 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. ~~The~~ Contractor shall not be liable to ~~the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.~~Owner or Designer for damage resulting from error, inconsistency, or omission in Contract Documents, unless Contractor discovered, or in the exercise of reasonable diligence should have discovered such error, inconsistency, or omission and failed to report it to Designer. If contractor performs construction activity when Contractor knows, or should know in exercise of reasonable diligence that the activity involves error, inconsistency, or omission in Contract Documents, Contractor shall assume responsibility for such performance and shall bear the attributable costs for correction.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice and a proposal of corrective changes to the Owner and ~~Architect~~ Designer and shall not proceed with that portion of the Work without ~~further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage.~~written instructions from the Designer that are accepted by the Contractor.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Contractor shall not receive material nor labor from one who submitted a competing general bid for the same Contract and subsequently withdrew, reneged, or otherwise failed to enter into the contract.

§ 3.4.2 ~~The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.~~Specified materials, equipment, and systems are essential elements of the Contract. If Contractor desires to use another material, equipment, or system in lieu thereof, Contractor shall request approval in writing and shall submit samples and data as required for Designer's consideration. Designer and Owner will be final judge of acceptability of substitution. No substitution shall be made without authority in writing from Designer. Not later that twenty-one (21) days after award of contract, Contractor shall provide a list showing names of manufacturers proposed for each specified product, and applicable name of installer, whether Contractor or subcontractor. Designer will within fourteen (14) days reply in writing to Contractor stating whether Owner or Designer, after due investigation, has reasonable objection to any such manufacturer or installer. If adequate data on proposed manufacturer or installer is not available, Designer may state that action will be deferred until Contractor provides further data. Contractor shall not make use of a manufacturer, or installer to which Owner or Designer has reasonably objected. Contractor shall receive appropriate adjustment in Contract Sum, Contract Time, or both for making such change unless objection was based on failure of manufacturer or installer to meet requirements of Contract Documents, in which case neither Contract Sum nor Contract Time shall be adjusted. Failure to object to a

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manufacturer shall not constitute waiver of requirements of Contract Documents. Products furnished by listed Contractor's manufacturers must conform to requirements of Contract Documents.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

§ 3.4.4 Contractor shall disclose existence and extent of financial interests, whether direct or indirect, which Contractor has in proposed subcontractors and material suppliers.

§ 3.4.5 PROHIBITION OF ILLEGAL IMMIGRANTS

§ 3.4.5.1 The requirements of Public Acts of 2006, Chapter Number 878, of the State of Tennessee, addressing the use of illegal immigrants in the performance of any contract to supply goods or services to the State of Tennessee, shall be a material provision of this Contract, a breach of which shall be grounds for monetary and other penalties, including termination of this Contract.

§ 3.4.5.2 The Contractor by entering into this contract attests, certifies, warrants, and assures that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor or consultant who will utilize the services of any illegal immigrant in the performance of this Contract.

§ 3.4.5.3 The Contractor understands and agrees that failure to comply with this section will be subject to the sanctions of Public Chapter 878 of 2006 for acts or omissions occurring after its effective date. This law provides for the prohibition of a Contractor from contracting with, or submitting an offer, proposal, or bid to contract with the State of Tennessee to supply goods or services for a period of one year after a Contractor is discovered to have knowingly used the services of illegal immigrants during the performance of this Contract.

§ 3.4.5.4 For purposes of this Contract, "illegal immigrant" shall be defined as any person who is not either a United States citizen, a lawful permanent resident, or a person whose physical presence in the United States is authorized or allowed by the Department of Homeland Security and who, under Federal immigration laws and/or regulations, is authorized to be employed in the U.S. or is otherwise authorized to provide services under the Contract.

§ 3.4.6 NON-DISCRIMINATION IN EMPLOYMENT:

§ 3.4.6.1 Contractor shall not discriminate against any employee nor applicant for employment because of race, creed, color, religion, sex, age, or national origin as defined in Tennessee Code Annotated (TCA) § 4-21-401, et seq, nor because of handicap, in accordance with TCA § 8-50-103.

§ 3.4.6.2 Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to handicap, race, creed, color, religion, sex, age, or national origin, including but not limited to practices in recruitment, recruitment advertising, employment, selection for training or apprenticeship, rates of pay or other forms of compensation, upgrading, demotion, transfer, layoff, or termination.

§ 3.4.6.3 Contractor shall post in conspicuous places, available to employees and applicants for employment, notices setting forth these policies of non-discrimination.

§ 3.4.6.4 Solicitations or advertisements for employees placed by or in behalf of Contractor shall state that qualified applicants shall receive consideration for employment without regard to handicap, race, creed, color, religion, sex, age, or national origin.

§ 3.4.7 PREVAILING WAGE SCALE:

§ 3.4.7.1 Contractor is required to comply with policies, conditions and rules of the Tennessee Department of Labor pursuant to TCA § 12-4-401, et seq, which include that if the Contract Sum exceeds fifty thousand dollars ($50,000.00), Contractor is required to pay Prevailing Wage Scale current in the area of the Project to laborers and mechanics employed on the Work, as set forth in said rules, policies, and statute, and to furnish weekly payrolls with the decision number noted on each to the Tennessee Department of Labor.

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§ 3.4.7.2 When a Federal Wage Scale will apply to the Project, it will be included in Contract Documents, and Contractor shall pay not less than rates set forth. If both federal and State wage rates apply to project, Contractor shall pay the higher of the two wage scales for each craft or trade.

§ 3.4.7.3 Current Prevailing Wage Scale Determination(s) for this project will have been bound herein, or issued by addendum at the end of the Conditions, if Owner's estimate of the value of Work indicates that it is required. Failure of Owner or Designer to provide current wage scale decision prior to bidding does not relieve Contractor of obligations set forth above.

§ 3.4.7.4 If Prevailing Wage Rates applicable to the Project change during the course of the Contract, or differ from those provided in Contract Documents, equitable adjustment in Contract Sum shall be made.

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner and ~~Architect~~ Designer that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the ~~Architect,~~ Designer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.2 Subparagraph 3.6.1 notwithstanding, if after bids are received or negotiations concluded, the State of Tennessee enacts a change in a sales, consumer, use, or similar state tax for the Work or a portion thereof provided by the Contractor, the Contract Sum shall be accordingly adjusted by appropriate modification or the Owner may make other lawful provision to mitigate the change.

§ 3.6.3 Neither Contract Sum nor Contract Time shall be adjusted for impacts resulting from a change in a tax by a governmental body other than the State of Tennessee, regardless of when the tax is enacted or goes into effect.

§ 3.7 PERMITS, FEES AND NOTICES

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

§ 3.7.2 ~~The~~ Except as provided in subparagraph 3.7.5, the Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 ~~It~~ Except as provided in subparagraph 3.7.5, it is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the ~~Architect~~ Designer and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

§ 3.7.4 ~~If~~ Except as provided in subparagraph 3.7.5, if the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the ~~Architect~~ Designer and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.5 This subparagraph applies to any applicable local government permit. The Owner is an agency of state government, and as such has sovereign immunity from the laws, ordinances, rules, regulations, and lawful orders of

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local governments within the state; however, the Contractor shall obtain all normal permits whenever possible as if the Owner had no such immunity. If a delay or denial in securing a local permit occurs, the Contractor shall continue the Work, inform the Designer and the Owner of the situation, propose corrective measures, and continue to pursue the customary permits.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by ~~Change Order.~~ Modification. The amount of the ~~Change Order~~ Modification shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ and designate a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the ~~Work.~~ Work through final inspection. Contractor shall not change such designation without consent of Owner; and, Owner's consent shall not be unreasonably withheld. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and ~~Architect's~~ Designer's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare and keep current, for the ~~Architect's~~ Designer's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the ~~Architect~~ Designer reasonable time to review submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and ~~Architect.~~ Designer.

§ 3.10.4 SCHEDULING ASSISTANCE

Owner may provide the Scheduling Assistance. If provided, such services will be set forth in the specification of Progress Schedules. If provided, the purpose of such services is to assist in producing a progress schedule for the Work; however, no express or implied guarantee or warrantee is provided by the Owner regarding the suitability of the derived schedules, and the Contractor retains full responsibility for the suitability of the schedules and for conforming to them. Contractor shall fully cooperate in developing a schedule, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

§ 3.10.5 COMMISSIONING CONSULTANT

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Owner may provide the services of a Commissioning Consultant, either as a consultant engaged by the Owner, or as Subcontractor under a specified allowance and selected by the Owner. If provided, such services will be set forth in the Specifications. The Contractor retains full responsibility for compliance with the Contract Documents. Contractor shall fully cooperate in commissioning, and shall require the necessary forces assisting the Contractor to likewise cooperate fully. If commissioning activities are included in the Work, they shall not be a cause for delay or cost claims.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

§ 3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the ~~Architect~~ Designer and shall be delivered to the ~~Architect~~ Designer for submittal to the Owner upon completion of the Work.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the ~~Architect~~ Designer is subject to the limitations of Section 4.2.7. Informational submittals upon which the ~~Architect~~ Designer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the ~~Architect~~ Designer without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the ~~Architect~~ Designer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the ~~Architect~~ Designer without action.

§ 3.12.6 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do ~~so,~~ so prior to providing that which is the subject of the submittal, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the ~~Architect.~~ Designer.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the ~~Architect's~~ Designer's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the ~~Architect~~ Designer in writing of such deviation at the time of submittal and (1) the ~~Architect~~ Designer has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of its responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the ~~Architect's~~ Designer's approval thereof.

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§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the ~~Architect~~ Designer on previous submittals. In the absence of such written notice the ~~Architect's~~ Designer's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the ~~Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures.~~ Work. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the ~~Architect~~ Designer will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the ~~Architect.~~ Designer. The Owner and the ~~Architect~~ Designer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided the Owner and ~~Architect~~ Designer have specified to the Contractor all performance and design criteria that such services must satisfy. ~~Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.~~ The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the ~~cost thereof shall be charged to the Contractor.~~ Contractor shall be responsible for the cost without increase to the Contract Sum.

§ 3.16 ACCESS TO WORK

§ 3.16.1 The Contractor shall provide the Owner and ~~Architect~~ Designer access to the Work in preparation and progress wherever ~~located.~~ located, so that each may perform functions and exercise rights under the Contract Documents.

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§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

§ 3.17.1 The Contractor ~~shall~~ shall, subject to approval by the Attorney General of the State of Tennessee with respect to suits or claims against Owner, defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and ~~Architect~~ Designer harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or ~~Architect.~~ Designer. However, if the Contractor knows or has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the ~~Architect.~~Designer.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law ~~and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the~~ Contractor ~~in accordance with Section 11.3, the Contractor~~ shall indemnify and hold harmless the Owner, ~~Architect, Architect's~~ Designer, Designer's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible ~~property~~ property, including loss of use resulting therefrom, (other than the Work itself), but only to the extent caused by the willful or negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.19 RELATIONS WITH OWNER"S REPRESENTATIVES

§ 3.19.1 Contractor, subcontractors, material suppliers, and sub-subcontractors shall neither offer nor give a product, service, payment, negotiable instrument, gift, gratuity, or other compensation in connection with this project to a representative or employee of the State of Tennessee, the Designer, or the Designer's consultants without Owner's consent. Evidence of a violation of this requirement may be cause for termination of this Contract.

§ 3.20 PARTICIPATION OF MINORITY-OWNED BUSINESSES:

§ 3.20.1 To the extent that the Contractor or a subcontractor is a Minority-owned Business, the Contractor shall report to the State its own status in this regard and the names and amounts of contracts entered into with Minority-owned Businesses on State projects in order for the State to collect data on such participation.

§ 3.20.2 "Minority-owned Business" means a business which is solely owned, or at least fifty-one percent (51%) of the assets of outstanding stock of which is owned, by an individual who personally manages and controls the daily operations of such business, and who is impeded from normal entry into the economic mainstream because of past practices of discrimination based on race, religion, ethnic background, sex, or disability.

§ 3.20.3 To be a "Minority-owned Business" for the purposes of this contract, a business must be certified as a "Minority-owned Business" by an agency of the federal government or the government of the State of Tennessee which is normally engaged in the practice of providing such certification.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

§ 4.1 ~~ARCHITECT~~DESIGNER

§ 4.1.1 ~~The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.~~"Designer" is the

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licensed prime design professional or firm lawfully practicing architecture, landscape architecture, or engineering, identified in the Bidding Documents and Agreement form for project, or the authorized representative thereof.

§ 4.1.2 Duties, responsibilities and limitations of authority of the ~~Architect~~ Designer as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and ~~Architect.~~ Designer. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the ~~Architect~~ Designer is terminated, the Owner shall employ a new ~~Architect against whom the Contractor has no reasonable objection and~~ Designer whose status under the Contract Documents shall be that of the former ~~Architect.~~ Designer.

§ 4.2 ~~ARCHITECT'S ADMINISTRATION OF THE CONTRACT~~DESIGNER'S ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The ~~Architect~~ Designer will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) ~~with the Owner's concurrence, from time to time~~ at the Owner's request during the one-year period for correction of Work described in Section 12.2. The ~~Architect~~ Designer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 4.2.2 The ~~Architect,~~ Designer, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the ~~Architect~~ Designer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The ~~Architect~~ Designer will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, ~~since these~~ which are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 The ~~Architect~~ Designer will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The ~~Architect~~ Designer will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the ~~Architect~~ Designer about matters arising out of or relating to the Contract. Communications by and with the ~~Architect's~~ Designer's consultants shall be through the ~~Architect.~~ Designer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the ~~Owner.~~ Owner or the Owner's designee.

§ 4.2.5 Based on the ~~Architect's~~ Designer's evaluations of the Contractor's Applications for Payment, the ~~Architect~~ Designer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The ~~Architect~~ Designer will have authority to reject Work that does not conform to the Contract Documents. Whenever the ~~Architect~~ Designer considers it necessary or advisable, the ~~Architect~~ Designer will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the ~~Architect~~ Designer nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the ~~Architect~~ Designer to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The ~~Architect~~ Designer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product ~~Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's~~

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Data, and Samples, checking for compliance with the requirements and conformance with the intent of the Contract Documents. The Designer's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the ~~Architect's~~ Designer's professional judgment to permit adequate ~~review.~~ review in accordance with 3.10.2. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The ~~Architect's~~ Designer's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The ~~Architect's~~ Designer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the ~~Architect,~~ Designer, of any construction means, methods, techniques, sequences or procedures. The ~~Architect's~~ Designer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The ~~Architect will prepare~~ Designer will assist the Owner in preparing Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4.

§ 4.2.9 The ~~Architect~~ Designer will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

§ 4.2.10 If the Owner and ~~Architect~~ Designer agree, the ~~Architect~~ Designer will provide one or more project representatives to assist in carrying out the ~~Architect's~~ Designer's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be ~~as set forth in an exhibit to be incorporated in the Contract Documents.~~incorporated in the Contract Documents if requested by the Contractor.

§ 4.2.11 The ~~Architect~~ Designer will interpret and decide matters concerning performance ~~under~~ under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The ~~Architect's~~ Designer's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the ~~Architect~~ Designer shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the ~~Architect~~ Designer to furnish such interpretations until 15 days after written request is made for them.

§ 4.2.12 Interpretations and decisions of the ~~Architect~~ Designer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and initial decisions, the ~~Architect~~ Designer will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in ~~good faith.~~accordance with a reasonable and professional standard of care.

§ 4.2.13 The ~~Architect's~~ Designer's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.3 CLAIMS AND DISPUTES

§ 4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 4.3.2 Time Limits on Claims. Claims by either ~~party~~ party, except claims of Liquidated Damages, must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. If the impact of the condition giving rise to the Claim cannot be fully evaluated, a preliminary notice of a pending claim shall be made within the stated time limit subject to further action in a timely manner. Claims must be initiated by written notice to the ~~Architect~~ Designer and the other party.

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§ 4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Section 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents taking into account that unless otherwise stipulated in Contract Documents, excavations and other subsurface construction activity shall be considered unclassified down to design depth, regardless of substrate and abandoned or inactive infrastructures or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The ~~Architect~~ Designer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the ~~Architect~~ Designer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the ~~Architect~~ Designer shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the ~~Architect~~ Designer has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the ~~Architect~~ Designer for initial determination, subject to further proceedings pursuant to Section 4.4.

§ 4.3.5 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as ~~provided herein shall be given before proceeding to execute the Work.~~ required by the Contract Documents shall be given to the Owner by the Contractor, and written notice received by the Contractor from Owner acknowledging the claim and authorizing construction activity to proceed, before the Contractor shall proceed to execute the construction activity giving rise to the claim; thence, the claim shall be addressed under provisions of section 4.4. Documentation of claims shall conform to the requirements of Article 7. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.6.

§ 4.3.6 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the ~~Architect,~~ Designer, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the ~~Architect,~~ Designer, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Section 4.3.

§ 4.3.7 Claims for Additional Time

§ 4.3.7.1 ~~If the Contractor wishes to~~ To make Claim for an increase in ~~the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work.~~ Contract Time, Contractor shall give written notice as provided herein, and either; 1) include an estimate of cost, which shall be limited to that allowed by 8.3.3, and an explanation of the cause and probable effect on progress of Work; or, 2) provide a brief description of the delay with an acceptable timeframe for later submission of the required estimate and explanation. In the case of a continuing ~~delay only one Claim is necessary.~~ delay, only one claim is necessary, and Contractor shall subsequently detail the full scope of the delay.

§ 4.3.7.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, ~~could not have been reasonably anticipated and~~ and a description of how the conditions had an adverse effect on the scheduled construction.

§ 4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 4.3.9 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that

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application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably ~~adjusted.~~adjusted subject to limitations and requirements contained in the Contract Documents.

§ 4.3.10 Claims for Consequential Damages. The Contractor ~~and Owner waive Claims against each other~~ waives claims against the Owner for consequential damages arising out of or relating to this ~~Contract. This mutual waiver includes:~~

~~.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and~~

~~.2 damages incurred by the Contractor for principal office expenses~~ Contract including but not limited to either party's termination in accordance with Article 14, principal office expenses, including the compensation of personnel stationed ~~there,~~ at the principal office, and any damages, for losses of financing, ~~business~~ business, and reputation, and for loss of ~~profit except anticipated profit arising directly from the Work.~~

~~This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 4.3.10 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.~~profit.

§ 4.4 RESOLUTION OF CLAIMS AND DISPUTES

§ 4.4.1 Decision of ~~Architect.~~ Designer. Claims, including those alleging an error or omission by the ~~Architect but excluding those arising under Sections 10.3 through 10.5,~~ Designer, shall be referred initially to the ~~Architect for decision. An initial decision by the Architect~~ Designer for decision. An initial decision or other action by the Designer in accordance with 4.4.2 shall be required as a condition precedent to ~~mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner.~~Claims or action pursuant to remedies provided by law for Claims between Owner and Contractor, unless the Designer fails to timely comply with 4.4.2.

§ 4.4.2 The ~~Architect~~ Designer will review Claims and within ten days of the receipt of the Claim or information preliminary or pursuant to a Claim or a modification to a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the ~~Architect~~ Designer is unable to resolve the Claim if the ~~Architect~~ Designer lacks sufficient information to evaluate the merits of the Claim or if the ~~Architect~~ Designer concludes that, in the ~~Architect's~~ Designer's sole discretion, it would be inappropriate for the ~~Architect to resolve the Claim.~~Designer to resolve the Claim. If Designer approves the Claim, respondent shall have ten (10) days after receipt to protest. If Designer rejects the Claim, claimant shall have thirty (30) days after receipt to protest, or the decision shall be final. If Designer suggests compromise, parties shall have ten (10) days after receipt to protest. If the Designer declines to resolve the claim, the Owner may, but is not obligated to, then take the lead in resolving the claim.

§ 4.4.3 In evaluating Claims, the ~~Architect~~ Designer may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the ~~Architect~~ Designer in rendering a decision. The ~~Architect~~ Designer may request the Owner to authorize retention of such persons at the Owner's expense.

§ 4.4.4 If the ~~Architect~~ Designer requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the ~~Architect~~ Designer when the response or supporting data will be furnished or advise the ~~Architect~~ Designer that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the ~~Architect~~ Designer will either reject or approve the Claim in whole or in part.

§ 4.4.5 The ~~Architect~~ Designer will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The

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approval or rejection of a Claim by the ~~Architect~~ Designer shall be final and binding on the parties but subject ~~to mediation and arbitration.~~to mediation, if consented to by both parties, and to remedies as otherwise provided by law.

§ 4.4.6 ~~When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.~~The State of Tennessee is not subject to arbitration.

§ 4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the ~~Architect~~ Designer or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the ~~Architect~~ Designer or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 4.4.8 ~~If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, by mediation or by arbitration.~~As a matter of law, the State of Tennessee and its property are not subject to mechanic's and material suppliers liens. Subcontractors, suppliers, and other claimants are protected through the Contract Bond as required by TCA § 12-4-201 et seq., the policies of the State Building Commission, and paragraph 11.5 of these Conditions. Specific requirements for notice of Claims on the bond are set forth in TCA § 12-4-205.

§ 4.5 ~~MEDIATION~~The State of Tennessee is not subject to mandatory mediation.

§ 4.5.1 ~~Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5 shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.~~

§ 4.5.2 ~~The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.~~

§ 4.5.3 ~~The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.~~

§ 4.6 ~~ARBITRATION~~
The State of Tennessee is not subject to arbitration.

§ 4.6.1§ 4.6.2§ 4.6.3 ~~**§ 4.6.1** Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Section 4.5.~~

~~**§ 4.6.2** Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.~~

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~~§ 4.6.3 A demand for arbitration shall be made within the time limits specified in Sections 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Section 13.7.~~

§ 4.6.4 ~~Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

§ 4.6.5§ 4.6.6 ~~§ 4.6.5 Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

~~§ 4.6.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, ~~as soon as practicable~~ within 21 days after award of the Contract, shall furnish in writing to the Owner through the ~~Architect~~ Designer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The ~~Architect~~ Designer will promptly reply to the Contractor in writing stating whether or not the Owner or the ~~Architect,~~ Designer, after due investigation, has reasonable objection to any such proposed person or entity. ~~Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.~~No construction activity shall be commenced by a person or entity in question until all objections have been resolved. If required, Contractor shall furnish evidence satisfactory to Designer, showing each proposed Subcontractor is competent to execute work covered by the subcontract. Subcontractors identified as a part of Contractor's bid for this project shall be used in the capacity listed, unless otherwise approved by the Owner in accordance with State Building Commission policy.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or ~~Architect~~ Designer has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or ~~Architect~~ Designer has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or ~~Architect~~ Designer has no reasonable objection. If the proposed but rejected Subcontractor was able to meet requirements of Contract Documents and reasonably capable

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of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or ~~Architect~~ Designer makes reasonable objection to such substitute.

§ 5.2.5 Contractor shall not award subcontract to one who submitted a competing general bid for the same Contract and subsequently withdrew, reneged, or otherwise failed to enter into contract.

§ 5.2.6 Contractor shall not allow work under the Contract to be performed contrary to the requirements of 3.4.5 nor by a Contractor or Subcontractor that has been disqualified from participating in State construction projects under the supervision of the State Building Commission. Such disqualification extends to succeeding or related corporations, partnerships, joint ventures, and other business organizations having substantial factual or legal connections, continuity, or identity with those that have been disqualified. If such a participant is discovered, Contractor shall immediately discontinue the participation and provide a suitable substitute at no additional cost to the Owner, and provide documentation to the Owner of the action taken to comply with this requirement.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and ~~Architect.~~ Designer. Each subcontract agreement shall preserve and protect the rights of the Owner and ~~Architect~~ Designer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Assignment is at the option of Owner, and creates no duty or obligation upon Owner to exercise this option, nor is any right created for any subcontractor to expect or rely upon such assignment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to ~~insurance and waiver of subrogation.~~ insurance. If the Contractor claims that delay or additional

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cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Section 4.3.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the ~~Architect~~ Designer apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of ~~delays,~~ improperly timed construction activities, damage to the ~~Work~~ Work, or defective construction of a separate contractor.

§ 6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

§ 6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the ~~Architect~~ Designer will allocate the cost among those ~~responsible.~~ responsible as provided in 3.15.2.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and ~~Architect;~~ Designer; a Construction Change Directive requires agreement by the Owner and ~~Architect~~ Designer and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the ~~Architect~~ Designer alone.

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§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument ~~prepared by the Architect and~~ signed by the Owner, Contractor and ~~Architect,~~ Designer, stating their agreement upon all of the following:

- .1 change in the Work;
- .2 the amount of the adjustment, if any, in the Contract Sum; and that the price includes overhead and profit, and represents all direct and indirect costs associated with the change; and
- .3 the extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 ~~Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.~~ Unless otherwise agreed in writing by Owner and Contractor, the method of determining adjustments in Contract Sum shall be by one or more of the methods set forth in 7.3.3, and shall be based on reasonable expenditures and savings as set forth in 7.3.6.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order ~~prepared by the Architect and~~ signed by the Owner and ~~Architect,~~ Designer, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 as provided in Section 7.3.6.

§ 7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the ~~Architect~~ Designer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the ~~proposed~~ adjustment in the Contract Sum or Contract Time.

§ 7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the ~~Architect~~ Designer on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, ~~a reasonable~~ an allowance for overhead and ~~profit.~~ profit in accordance with 7.3.10. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the ~~Architect~~ Designer may prescribe, an itemized accounting together with appropriate supporting data. ~~Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.6 shall be limited to the following:~~

- ~~.1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;~~
- ~~.2 costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;~~

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~~.3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;~~

~~.4 costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and~~

~~.5 additional costs of supervision and field office personnel directly attributable to the change.~~

§ 7.3.6.1 Costs for the purpose of this 7.3.6 shall be limited to the following:

§ 7.3.6.1.1 Payroll Expense of labor;

§ 7.3.6.1.2 costs of materials, supplies, and equipment, including cost of transportation thereof, whether incorporated or consumed;

§ 7.3.6.1.3 rental costs of machinery and equipment rented from others, and not more than eighty percent (80%) of the (Associated Equipment Distributors Nationally Averaged Rental Rates for Construction Equipment) for machinery and equipment belonging to Contractor;

§ 7.3.6.1.4 costs of premiums for bonds and insurance to the extent required by Contract Documents, permit fees, and sales, use, or other similar taxes related to the Work;

§ 7.3.6.1.5 additional Direct Payroll Expense of superintendence directly attributable to authorized overtime; and,

§ 7.3.6.2 The following items are "Class 1 Time-Related Expenses", and shall be considered as costs when Contract Time is extended due to additional work or due to a Class 1 cause defined in 8.3, and solely to the extent directly attributable to extension of time. In all other instances, the following items shall be considered fixed costs already included in the general requirements of the Work for the duration of the Contract Time:

§ 7.3.6.2.1 field offices, sheds, phones, sanitary facilities, on-site utilities, drinking fountains, cleaning, safety programs, and other construction facilities and temporary controls not specifically required for additional work;

§ 7.3.6.2.2 costs of superintendence;

§ 7.3.6.2.3 superintendent's vehicle;

§ 7.3.6.2.4 other general use vehicles, being those requiring a class D, H, or M license, and excluding those requiring a class A, B, or C license, as set forth in the Tennessee Driver Handbook or comparable current successor publication of the Tennessee Department of Safety.

§ 7.3.6.3 for trade contracts direct payroll expense (DPE) costs delineated in 7.3.6.1.1, 7.3.6.1.5, 7.3.6.1.6, and 7.3.6.2.2 shall be limited to base salary or hourly wage plus a maximum of thirty nine percent (39%) of base salary or hourly wage, and further limited to a maximum of one hundred fifty five dollars ($155) per hour, to cover social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance.

§ 7.3.6.4 Specifically excluded from costs and included in overhead are:

§ 7.3.6.4.1 corporate, home office, and branch office overhead, rent, mortgage, off-site utilities, project management, and personnel not otherwise mentioned;

§ 7.3.6.4.2 capital expenses and interest on capital;

§ 7.3.6.4.3 hand tools

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§ 7.3.6.5 To facilitate checking for increases or decreases in the Contract Sum, proposals shall be accompanied by Contractor's complete itemization of costs of work including labor, materials and equipment, plus allowance for overhead and profit.

§ 7.3.7 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the ~~Architect.~~ Designer. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts ~~not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4.~~ included in the Contract Sum by the Construction Change Directive for such changes shall be included in the Schedule of Values.

§ 7.3.9 When the Owner and Contractor agree with the determination made by the ~~Architect~~ Designer concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

§ 7.3.10 The allowance for overhead and profit on costs as stipulated in subparagraph 7.3.6 shall be:

§ 7.3.10.1 ten percent (10%) overhead added to the itemized cost; plus,

§ 7.3.10.2 five percent (5%) profit added to the itemized cost and overhead; plus

§ 7.3.10.3 five percent (5%) added to the itemized cost, overhead, and profit, when the itemized cost is for work performed by a subcontractor or sub-subcontractor.

§ 7.4 MINOR CHANGES IN THE WORK

§ 7.4.1 The ~~Architect~~ Designer will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the ~~Architect~~ Designer in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

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§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. ~~Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.~~

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion ~~within the Contract Time.~~in accordance with the Agreement.

§ 8.3 ~~DELAYS AND EXTENSIONS OF TIME~~DELAYS AND EXTENSIONS OF TIME, AND FORCED ACCELERATION

§ 8.3.1 ~~If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.~~The basis exists for an extension of time if Contractor is delayed in performing Work, but solely to the extent that delays are unforeseeable, unavoidable, and beyond the control and without fault or negligence, in whole or in part, of Contractor, subcontractors, sub-subcontractors, and suppliers at every tier, and said delays directly impact the Contractor's ability to achieve Substantial Completion in accordance with the Contract Time requirements, and said delays cannot be made up by reasonable efforts otherwise, and said delays stem from the following causes:

§ 8.3.1.1 Class 1 causes: an act or failure to act that is contrary to the Contract Documents on the part of Owner or Designer or an employee of either, or of a separate Contractor employed by Owner, or an injunction against Owner or Owner's representatives.

§ 8.3.1.2 Class 2 causes: abnormal weather, acts of God, riots, civil commotion, acts of War, fire, unavoidable casualties, epidemics, quarantine restrictions, labor disputes, unusual delay in transportation, freight embargoes, or insolvency of subcontractors, sub-subcontractors, or suppliers.

§ 8.3.2 ~~Claims relating to time shall be made in accordance with applicable provisions of Section 4.3.~~If the basis exists for an extension of time under 8.3.1, Owner may either:

§ 8.3.2.1 in the case of additional work or a Class 1 cause, assign the Class 1 Time-Related Expenses, defined in 7.3.6.2, plus the overhead and profit allowed in 7.3.10, to a special allowance that can be earned based upon the extent of actual use of the related Time Extension in completion of the Work;

§ 8.3.2.2 accept the reasonable and appropriate time extension as determined by Designer to cover such delay, and in the case of a Class 2 cause, there will be no corresponding adjustment in Contract Sum, and the sole recourse of Contractor will be entitlement to time extension as provided by Designer regardless of actual source or cause of delay;

§ 8.3.2.3 order Contractor to accelerate construction activity by working overtime and by adding extra forces in order to overcome such delays, and adjusting the Contract Sum in accordance with Article 7 to compensate Contractor for such directed acceleration; however, direct costs used in determining such compensation shall be limited to properly substantiated and documented premium or overtime labor costs; or,

§ 8.3.2.4 employ a combination of the above remedies.

§ 8.3.3 ~~This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.~~Neither Owner nor Designer will be obligated or liable to Contractor for, and Contractor hereby expressly waives claims against Owner and Designer on account of damages, costs, expenses, or related impacts which Contractor, Subcontractors, sub-subcontractors, suppliers, or other persons may incur as a result of a Class 2 cause enumerated in 8.3.1. Contractor's sole and exclusive remedy and full compensation in such event shall be extension of Contract Time in accordance with provisions of the Contract Documents. Contractor likewise

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waives claims of damages, costs, or expenses due to a delay resulting from a Class 1 cause except and solely to the extent of costs allowed under 7.3.6."

§ 8.3.4 Claims relating to time shall be made in accordance with applicable provisions of 4.3 or shall receive no consideration. If monthly Weather Delay Reports are required by the specifications, then Claims for time extension based upon weather delays will be denied if a submitted report does not corroborate the Claim or if no report was submitted when it was required, and Contractor waives the right to such claims.

§ 8.3.5 Extensions of time shall be implemented in accordance with Article 7.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

§ 9.1.1 The Contract Sum is a Guaranteed Maximum Price (GMP) as stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 Contract Sum is not subject to change due to commodity, equipment or labor cost fluctuations.

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Before the first Application for Payment, the Contractor shall submit to the ~~Architect~~ Designer a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the ~~Architect~~ Designer may require. This schedule, unless objected to by the ~~Architect,~~ Designer, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 ~~At least ten days before~~ Prior to the date established for each progress payment, the Contractor shall submit to the ~~Architect~~ Designer an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, ~~if required,~~ and supported by such data substantiating the Contractor's right to payment as the Owner or ~~Architect~~ Designer may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, ~~or by interim determinations of the Architect,~~ but not yet included in Change Orders.

§ 9.3.1.2 Such applications ~~may~~ shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the ~~site for such materials and equipment stored off the site.~~ extent those costs have been included in the Contract Sum and actually incurred. Additional costs, which may be attendant to off-site storage, will not constitute a basis for increasing the Contract Sum.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner ~~no later than the time of payment.~~ at the time payment is received by the Contractor. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

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§ 9.3.4 In Applications for Payment, the amount represented as total completed and stored to date shall reflect the portion of the Contract Sum properly allocable to labor, materials, and equipment incorporated in the Work and materials and equipment suitably stored in accordance with subparagraph 9.3.2, and not exceed the Contract Sum less the value of incomplete work and corrections required. This total completed and stored to date shall not be construed to define completion as determined for substantial completion or final completion of the Work according to 9.8, 9.9, or 9.10.

§ 9.3.5 Applications for Payment shall indicate retainage withheld from the total completed and stored to date as follows: five percent (5%) until acceptance of a certificate of Substantial Completion; and, thereafter two percent (2%) until final payment. The resulting amount shall be indicated as the total earned less retainage. Applications that reduce retainage shall be accompanied by Consent of Surety.

§ 9.3.6 Applications for payment shall indicate the total earned less retainage, and the aggregate of previous payments made subtracted therefrom, and an amount requested.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The ~~Architect~~ Designer will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the ~~Architect~~ Designer determines is properly due, or notify the Contractor and Owner in writing of the ~~Architect's~~ Designer's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the ~~Architect~~ Designer to the Owner, based on the ~~Architect's~~ Designer's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the ~~Architect's~~ Designer's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the ~~Architect.~~ Designer. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the ~~Architect~~ Designer has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, ~~(3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment,~~ or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The ~~Architect~~ Designer may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the ~~Architect's~~ Designer's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the ~~Architect~~ Designer is unable to certify payment in the amount of the Application, the ~~Architect~~ Designer will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and ~~Architect~~ Designer cannot agree on a revised amount, the ~~Architect~~ Designer will promptly issue a Certificate for Payment for the amount for which the ~~Architect~~ Designer is able to make such representations to the Owner. The ~~Architect~~ Designer may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the ~~Architect's~~ Designer's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or another contractor;
- **.6** ~~reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;~~ accrued potential liquidated damages and other unsettled claims; or

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.7 ~~persistent~~ failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When any of the above reasons for withholding certification are removed, certification will be made for respective amounts previously withheld.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the ~~Architect~~ Designer has issued a Certificate for Payment, the Owner shall make payment in ~~the manner and within the time provided in the Contract Documents, and shall so notify the Architect.~~accordance with TCA § 12-4-701 et seq, as may from time to time be amended.

§ 9.6.1.1 Payment is due not later than forty five (45) days after an undisputed Certificate for Payment has been received by Owner. Owner will endeavor to make payment within twenty-one (21) days, but shall not be obligated to do so.

§ 9.6.1.2 Based upon Certificates for Payment issued by the Designer, correcting the Application for Payment as appropriate, the Owner shall make progress payments to the Contractor as provided in the Contract Documents.

§ 9.6.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the ~~Contractor on account of such Subcontractor's portion of the Work,~~ Contractor, the amount to which said Subcontractor is ~~entitled, reflecting percentages actually retained from payments to the Contractor on account of~~ entitled for such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The ~~Architect~~ Designer and Owner will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the ~~Architect~~ Designer and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 Neither the Owner nor ~~Architect~~ Designer shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 ~~Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.~~Contracts for improvement of real property when the original Contract Sum meets the statutory threshold, the Contractor shall comply with the procedures established by the Tennessee State Treasurer and Department of Finance and Administration for establishment of an interest-bearing retainage escrow account.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the ~~Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the~~ Owner does not pay the Contractor within seven days after the date payment is due as established in the Contract Documents the amount ~~certified by the Architect or awarded by arbitration,~~ currently due as of that date pursuant to the terms of the Contract Documents (including certification by the Designer), then the Contractor may, upon seven additional days' written notice to the Owner and ~~Architect,~~ , stop the Work until payment of the amount ~~owing~~ due has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

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§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. In order to occupy or utilize the Work for its intended use, Owner must have received complete Product Data, Operating & Maintenance Data, orientation, and training, as may be required by specifications, and use and occupancy permits.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the ~~Architect~~ Designer a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the ~~Architect~~ Designer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. ~~If the Architect's~~ Not later than at the time of this inspection, the Contractor will submit its application for payment commensurate with Substantial Completion. If the Designer's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the ~~Architect.~~ Designer. In such case, the Contractor shall then submit a request for another inspection by the ~~Architect~~ Designer to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the ~~Architect~~ Designer will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying ~~the Certificate.~~ the Certificate, subject to the provisions of 9.12.2. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. ~~Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.~~

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the ~~Architect~~ Designer as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the ~~Architect.~~ Designer.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and ~~Architect~~ Designer shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

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§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the ~~Architect~~ Designer will promptly make such inspection and, when the ~~Architect~~ Designer finds the Work acceptable under the Contract Documents and the Contract fully performed, the ~~Architect~~ Designer will promptly issue a final Certificate for Payment stating that to the best of the ~~Architect's~~ Designer's knowledge, information and belief, and on the basis of the ~~Architect's~~ Designer's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The ~~Architect's~~ Designer's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the ~~Architect~~ Designer (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the ~~Owner,~~ Owner in writing, other data establishing payment or satisfaction of obligations, such as receipts, releases and ~~waivers of liens,~~ waivers, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor ~~may furnish a bond~~ shall furnish acknowledgment of the matter from the Surety satisfactory to the Owner to indemnify the Owner against such ~~lien. If such lien~~ matter in lieu of such a release or waiver. If such matter remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such ~~lien,~~ matter, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the ~~Architect~~ Designer so confirms, the Owner shall, upon application by the Contractor and certification by the ~~Architect,~~ Designer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the ~~Architect~~ Designer prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall not constitute a waiver of Claims by the Owner ~~except those arising from:~~for the following:

.1 ~~liens,~~ Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract ~~Documents;~~ Documents irrespective of when such failure is discovered; or

.3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment ~~by the Contractor, a Subcontractor or material supplier~~ shall constitute a waiver of claims ~~by that payee~~ except those previously made in writing and identified ~~by that payee~~ as unsettled at the time of final Application for Payment.

§ 9.10.6 Final Payment constituting the entire unpaid balance of Contract Sum, shall be paid by Owner to Contractor when Work has been completed, the Contract fully performed, and a final Certificate for Payment issued by Designer.

§ 9.11 METHOD OF PAYMENT

§ 9.11.1 Payments to Contractor shall be made through Owner's automated clearing house wire transfer system. Contractor shall have completed an Authorization Agreement for Automatic Deposits ACH Credits Form prior to commencing Work and prior to submitting a first application for payment.

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§ 9.11.2 Debit entries to correct errors authorized by the Authorization Agreement for Automatic Deposits ACH Credits Form shall be limited to those errors detected prior to the effective date of the credit entry. The remittance advice shall note that a correcting entry was made. Corrections shall be made within two banking days of the effective date of the original transaction. Other errors detected at a later date shall take the form of a refund, or in some instances, a credit memo if additional payments are to be made.

§ 9.11.3 The Owner reserves the right to deduct from amounts which are or shall become due and payable to Contractor under this or any contract between the parties any amounts which are or shall become due and payable to the State by the Contractor.

§ 9.12 LIQUIDATED DAMAGES

§ 9.12.1 Time being of the essence, Contractor further agrees to accept conditions for liquidated damages in the amount set forth in Contract Documents for each calendar day in excess of allotted time for Substantial Completion, or approved extension thereof, parties agreeing that the amount of damages resulting from delay would be uncertain and difficult to prove, and further agreeing that such liquidated damages set forth in the Owner-Contractor Agreement are a reasonable estimate of those damages which could result from delay.

§ 9.12.2 If a portion of the Work is certified Substantially Complete, the amount of Liquidated Damages applicable to the remaining Work may be reduced by written mutual agreement.

§ 9.12.3 Secondary Liquidated Damages shall be twenty-five percent (25%) of that originally required by the Contract Documents, and shall accrue until such time that Work has been completed and the Contract fully performed if:

§ 9.12.3.1 the time for completion stipulated in the Certificate of Substantial Completion has passed; or, if no such time was stipulated, then thirty (30) calendar days has passed following the certified date of Substantial Completion; and,

§ 9.12.3.2 the Contract Time, including approved extensions, plus thirty (30) calendar days, has passed.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed

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by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or ~~Architect~~ Designer or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. Owner reserves the right to effect emergency repairs to damaged property and make appropriate claims for costs. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and ~~Architect.~~Designer.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the ~~Contractor,~~ Contractor which has neither been rendered harmless nor specified as inherent in the Work, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and ~~Architect~~ Designer in writing.

§ 10.3.2 Under circumstances described in 10.3.1, Owner will have the option to either terminate the contract as provided in Article 14, proceed with Contractor in a mutually agreed plan of action, or as follows: The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and ~~Architect~~ Designer the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the ~~Architect~~ Designer will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or ~~Architect~~ Designer has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the ~~Architect~~ Designer have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up, which adjustments shall be accomplished as provided for claims in Article 4 and for changes in the Work in Article 7.

§ 10.3.3 ~~To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.~~

§ 10.4 The Owner shall not be responsible under Section 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

§ 10.5 ~~If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.~~

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§ 10.6 EMERGENCIES AND UNREASONABLE RISK

§ 10.6.1 In an emergency or unreasonable risk affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance required by the Contract Documents as will protect the Contractor and the Owner from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- **.2** claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** claims for damages insured by usual personal injury liability coverage;
- **.5** claims for damages, other than to the Work itself, because of injury to or destruction of tangible ~~property,~~ property on or away from the site, including loss of use resulting therefrom;
- **.6** claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** claims for bodily injury or property damage arising out of completed operations; and
- **.8** claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Specific lines of coverage and limits of liability provided by Contractor shall be written in a comprehensive form, satisfactory to Owner in the following minimum requirements:

§ 11.1.2.1 Comprehensive General Liability

§ 11.1.2.1a including:

Premises / Operations
Underground, explosion, collapse
Products / Completed Operations
Contractual
Independent Contractors
Owner/Contractor Protective
Broad Form Property Damage
Personal injury (Employment Exclusion deleted)

§ 11.1.2.1b Combined single limits for bodily injury and property damage:

Each Occurrence: **$1,000,000**
Aggregate: **$2,000,000**

§ 11.1.2.1c Products and Completed Operations to be maintained for one year after final payment.

§ 11.1.2.1d Asbestos abatement insurance

§ 11.1.2.1d.1 Non-friable asbestos: If removal or abatement of non-friable asbestos is included in the Work, and Contractor's General Liability Insurance coverage excludes risks associated with asbestos, Contractor shall provide evidence of a Special Endorsement.

§ 11.1.2.1d.2 Friable asbestos: If removal or abatement of friable asbestos is included in the Work, Contractor shall provide evidence of a special endorsement.

§ 11.1.2.1d.3 Special Endorsement: Evidence of a Special Endorsement shall be in the form of a Certificate of Insurance certifying a special endorsement for asbestos abatement insurance with a minimum $500,000 limit of liability. If Contractor is performing no portion of the asbestos

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removal or abatement with its own forces, Contractor, in lieu of its own such endorsement, may substitute a Certificate showing such special endorsement covering the subcontractor or sub-subcontractor which is actually performing the asbestos removal or abatement.

§ 11.1.2.2 Comprehensive Automobile Liability:

§ 11.1.2.2a Including owned, hired, and non-owned vehicles; or, if there are no owned vehicles, Contractor may provide written certification of such and provide coverage limited to hired and non-owned vehicles.

§ 11.1.2.2b Bodily injury and property damage combined single limits:

Each Occurrence: **$500,000**

§ 11.1.2.3 Workers Compensation and Employer's Liability, (without restriction as to whether covered by Workmen's Compensation law):

§ 11.1.2.3.a Workers Compensation: according to statute

§ 11.1.2.3.b Employer's Liability: **$100,000**

§ 11.1.2.4 If an exposure exists, Aircraft and Watercraft Liability (owned & non-owned), with limits approved by Owner shall be provided.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. ~~These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner.~~ Certificate(s) of insurance provided to attest to coverage shall specifically cite each element of coverage and not less than limits set forth in 11.1.2, as confirmation of complete coverage, and shall identify Contractor, Producer, insurance Carrier, Project, and certificate holder, and state Producer's notice requirements as set forth in 11.1.4. The term "Commercial General Liability" shall mean all of the coverage listed in 11.1.2.1.a unless specifically noted otherwise in the certificate. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Section 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

§ 11.1.4 Contractor shall notify Owner in writing of changes in coverage or carrier not later than 10 days after notification of Contractor by Producer, or 10 days before Contractor makes a change, whichever occurs first. Contractor shall require that if policies are cancelled or modified before expiration date thereof, Producer shall endeavor to mail 10 days prior written notice to certificate holder named therein.

§ 11.2 ~~OWNER'S LIABILITY INSURANCE~~

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

§ 11.3§ 11.3.1 **~~§ 11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE~~**

~~§ 11.3.1~~ ~~Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Architect's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Sections 11.1.1.2 through 11.1.1.5.~~

§ 11.3.2 ~~To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.~~

§ 11.3.3 ~~The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor's Liability Insurance coverage under Section 11.1.~~

§ 11.4 PROPERTY INSURANCE

§ 11.4.1 ~~Unless otherwise provided, the~~ The Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a

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builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications ~~and cost of materials supplied or installed by others, comprising total value for the entire~~ for the covered Project at the site on a replacement cost ~~basis without optional deductibles.~~ basis. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.4 to be covered, whichever is later. This insurance shall ~~include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.~~specify the Owner, as named insured and the Contractor, Subcontractors and Sub-subcontractors, as additional insureds under the policy.

§ 11.4.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, ~~falsework, testing and startup, temporary buildings~~ and debris removal ~~including demolition occasioned by enforcement of any applicable legal requirements,~~ and shall cover reasonable compensation for ~~Architect's and Contractor's~~ Designer's services and expenses and Contractor's work required as a result of such insured loss. Such insurance carried by the Owner will include a $10,000 deductible clause. The deductible is the responsibility of the Contractor.

§ 11.4.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Owner as a named insured, Contractor, Subcontractors and Sub-subcontractors in the Work, and ~~by appropriate Change Order~~ if not included in the Contract Sum the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

~~**§ 11.4.1.3** If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.~~

§ 11.4.1.4 ~~This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.~~The Owner's property insurance shall exclude portions of the Work stored off-site or in transit; and, Contractor shall provide insurance upon such portions to protect the Owner's interest.

§ 11.4.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.4.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.4.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. ~~The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.~~

§ 11.4.4 ~~If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.~~**§ 11.4.5§ 11.4.6** Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the issuing company will endeavor to provide ten (10) days written notice to the Contractor should the policy be

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canceled prior to the expiration date. Failure to provide such notice shall impose no obligation or liability of any kind upon the Owner or issuing company.

§ 11.4.5 ~~If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.~~

§ 11.4.6 ~~Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.~~

§ 11.4.7 ~~Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.~~

§ 11.4.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.4.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.4.9 If ~~required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Section 4.6. If after such~~ after an insured loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with ~~insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Sections 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.~~insurers.

§ 11.5 PERFORMANCE BOND AND PAYMENT BOND

§ 11.5.1 ~~The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.~~If the initial Contract Sum as awarded exceeds $100,000, Contractor shall provide Contract Bond, in the amount of one hundred percent (100%) of Contract Sum covering faithful performance of contract and payment of obligations arising thereunder. If a Contract

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Bond is required, and a Three Year Roof Bond is also stipulated in the Bidding Documents, then the Three Year Roof Bond shall be provided as stipulated. Bond(s) shall be executed on Tennessee State Building Commission Standard Form(s) exhibited in Bidding Documents for project, and subject to provisions of 11.5.3.

§ 11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor and Owner shall promptly furnish a copy of the bonds or shall permit a copy to be made.

§ 11.5.3 Surety is the person or entity identified as such in a bond and is referred to throughout the Contract Documents as if singular in number. The term "Surety" means the Surety or the Surety's authorized representative. Surety Company issuing bond shall be licensed to transact business in Tennessee by Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety's Attorney-in-Fact attached. Attorney-in-fact who executes bond on behalf of Surety shall be one who is licensed by Tennessee as a resident agent, and shall affix license number to bond; or, countersignature by and license number of a licensed resident agent shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the ~~Architect's~~ Designer's written request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the ~~Architect,~~ Designer, be uncovered for the ~~Architect's~~ Designer's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the ~~Architect~~ Designer has not specifically requested in writing to examine prior to its being covered, the ~~Architect~~ Designer may request in writing to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, ~~correction shall be at the Contractor's expense~~ uncovering, correction, and recovering shall be by the Contractor with no increase to the Contract Sum unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs. The Contract Time shall be adjusted for all such requests to examine, except for time due to corrective Work.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

§ 12.2.1.1 The Contractor shall promptly correct Work rejected by the ~~Architect~~ Designer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the ~~Architect's~~ Designer's services and expenses made necessary thereby, shall be ~~at the Contractor's expense.~~ reimbursable to the extent permitted by the Agreement.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor of known noncomplying Work and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct ~~nonconforming~~ noncomplying Work within a reasonable time ~~during that period~~ after receipt of notice from the Owner or ~~Architect,~~ Designer the Owner may correct it in accordance ~~with Section 2.4.~~ with 2.4 If Three Year Roof Bond has been provided, then with regard to the total roofing system, its installation, and materials, the one year time period hereunder is extended for two (2) additional years for a total period of three (3) years. Until such time as the three (3) years hereunder have expired, Contractor's obligations hereunder shall be joint and several with Company as defined and set forth in the Roofing System Warranty. For the purpose of Subparagraph 12.2.2, all of Company's actions, whether of omission or commission, pursuant to the

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Roofing System Warranty are likewise actions of Contractor hereunder and shall in no way negate or reduce the responsibilities of Contractor hereunder.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor ~~shall~~ shall, without increase in the Contract Sum,~~+~~ bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 ~~relates~~ and time periods of applicable special warranties, relate only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ~~ACCEPTANCE OF NONCONFORMING WORK~~ACCEPTANCE OF INCOMPLETE OR NONCONFORMING WORK

§ 12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its completion or removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

§ 13.1.1 The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. ~~Except as provided in Section 13.2.2, neither~~ Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 ~~The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.~~

§ 13.3 WRITTEN NOTICE

§ 13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

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§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, ~~Architect~~ Designer or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

§ 13.4.3 If normal procedures within the Contract fail to satisfy a Claim against the Owner, further action is to be taken up with the Tennessee Claims Commission, pursuant to TCA § 9-8-101, et seq. Damages recoverable against the State shall be limited expressly to Claims awarded by the Commission.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall ~~bear~~ as a cost of the Work pay all related costs of tests, inspections and approvals. The Contractor shall give the ~~Architect~~ Designer timely notice of when and where tests and inspections are to be made so that the ~~Architect~~ Designer may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

§ 13.5.2 If the ~~Architect,~~ Designer, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the ~~Architect~~ Designer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the ~~Architect~~ Designer of when and where tests and inspections are to be made so that the ~~Architect~~ Designer may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by the correction of such failure including those of repeated procedures ~~and compensation for the Architect's services and expenses shall be at the Contractor's expense.~~thereafter and compensation for the Designer's services and expenses with no increase to the Contract Sum.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the ~~Architect.~~Designer.

§ 13.5.5 If the ~~Architect~~ Designer is to observe tests, inspections or approvals required by the Contract Documents, the ~~Architect~~ Designer will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

§ 13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is ~~due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~past due as stated in 9.6.1 in accordance with TCA § 12-4-704, as may from time to time be amended.

~~**§ 13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD**~~

§ 13.7.1 ~~As between the Owner and Contractor:~~

~~.1 Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;~~

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~~.2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and~~

~~.3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.~~

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;

.2 an act of government, such as a declaration of national emergency which requires all Work to be ~~stopped;~~stopped or;

.3 because the ~~Architect~~ Designer has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract ~~Documents; or~~

~~.4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.~~Documents.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and ~~Architect,~~ Designer, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and ~~damages.~~costs as defined in 7.3.6..

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the ~~Architect,~~ Designer, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

.1 ~~persistently~~ refuses or repeatedly ~~refuses or~~ fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 ~~persistently disregards~~ disregards or repeatly fails to comply with laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the ~~Architect~~ Designer that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 take possession of all Work in place and of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 accept assignment of subcontracts pursuant to Section 5.4; and

.3 finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the ~~Architect's~~ Designer's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the ~~Architect,~~ Designer, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the ~~Work;~~ Work including materials for which Owner has paid and which are stored off-site; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for ~~Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.~~the completed portion of Work plus a fraction of five percent (5%) of the remaining balance of the Contract Sum, which fraction shall be equal to the value of the Work completed divided by the Contract Sum.

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Certification of Document's Authenticity

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I, Jerry Preston, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 16:22:17 on 01/09/2008 under Order No. 1000323519_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 1997 - General Conditions of the Contract for Construction, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

_____

(Signed)

_____

(Title)

_____

(Dated)

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SUPPLEMENTARY CONDITIONS

Modifications to AIA Document A201-1997 OFD 00 72 23 CM/GC December 2007

The following supplements modify, change, delete from or add to "General Conditions of the Contract for Construction", AIA Document A201, 1997 Edition, for all General Work (OFD 00 72 23 CM/GC) December 2007 issue. Where an Article, Paragraph, Subparagraph or Clause of General Conditions is modified or deleted by Supplementary Conditions unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

TITLE PAGE

TITLED REFERENCE: Delete that designated and substitute with the following: "Tennessee Department of General Services projects utilizing CM/GC Agreement"

THE OWNER: Delete that designated and substitute with the following: "State of Tennessee, Department of General Services"

3 CONTRACTOR

3.4 Add subparagraphs 3.4.5.5 through 3.4.5.7 as follows:

3.4.5.5 The Contractor shall reaffirm this attestation, in writing, by submitting to the Owner a completed and signed copy of the standard form entitled "Personnel Used in Contract Performance" with each application for payment. This form is provided in the Contract Documents. Such attestations shall be maintained by the Contractor and made available to state officials upon request.

3.4.5.6 Prior to the use of any subcontractor in the performance of this Contract, and semi-annually thereafter, during the period of this Contract, the Contractor shall obtain and retain a current, written attestation that the subcontractor shall not knowingly utilize the services of an illegal immigrant to perform work relative to this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant to perform work relative to this Contract. Attestations obtained from such subcontractors shall be maintained by the Contractor and made available to state officials upon request.

3.4.5.7 The Contractor shall maintain records for all personnel used in the performance of this Contract. Said records shall be subject to review and random inspection at any reasonable time upon reasonable notice by the Owner.

3.10 Delete subparagraphs 3.10.4 and 3.10.5, and substitute subparagraphs 3.10.4 through 3.10.7 as follows:

3.10.4 Scheduling Agent
At any time during the course of the Work, Owner may provide the services of a Construction Scheduling Agent. If provided, such services will be set forth in the specification of Progress Schedules. If provided, the purpose of such services is to assist in producing a progress schedule for the Work; however, no express or implied guarantee or warrantee is provided by the Owner regarding the suitability of the derived schedules, and the Contractor retains full responsibility for the suitability of the schedules and for conforming to them. Contractor shall cooperate fully in developing a schedule, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

3.10.5 Commissioning Agent
At any time during the course of the Work, Owner may utilize the services of a Commissioning Agent to have selected building systems commissioned. If utilized, such services and systems will be set forth in the specifications of Commissioning Requirements. If utilized, the purpose of such services is to ensure that all building systems perform interactively according to the design intent as indicated by the Contract Documents and the Owner's operational needs. The Commissioning Agent will direct the commissioning process. Contractor shall cooperate fully in the commissioning process, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

3.10.6 Hazardous Materials Agent
At any time during the course of the Work, Owner may utilize the services of a Hazardous Materials Agent to perform assessment of possible hazardous materials encountered by the Contractor in performance of the Work. If utilized, such services will be set forth in the specifications of Hazardous Materials Assessment Requirements. If utilized, the purpose of such services is to determine the appropriate course of action to contend with such materials in accordance with the Contract Documents. Contractor shall cooperate fully in the assessment process, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

3.10.7 Disaster Recovery Agent
At any time during the course of the Work, Owner may utilize the services of a Disaster Recovery Agent to perform emergency disaster recovery services at the project site relating to Contractor performance of the Work, or other circumstances. Time being of the essence, such work will be to mitigate material damages that has occurred with the intent to lessen costs potentially to the Contractor and Owner. Contractor shall cooperate fully in the disaster recovery process, and shall require the necessary forces assisting the Contractor to likewise cooperate fully.

3.18 Delete subparagraph 3.18.1, and substitute as follows:

3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, and agents and employees of the Owner from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including loss of use resulting therefrom, (other than the Work itself), but only to the extent caused by the willful or negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18. Contractor agrees to indemnify the Designer and Designer's consultants based on the willful or negligent acts or omissions of the Contractor, except that Contractor shall not indemnify the Designers and Designer's consultants based on design mistakes and errors or omissions.

3.21 Add paragraph 3.21 as follows:

3.21 Security of Protected Information

3.21.1 Contractor is required to comply with policies, conditions and rules of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and its accompanying regulations, which includes protection of the security of information identified as protected health information (PHI).

3.21.2 If Contractor is notified of the presence of PHI contained in facilities identified in the Work, then Contractor shall transmit such notice to all employees, subcontractors, material suppliers, and other affiliates of the Contractor allowed access to such facilities during the course of the Work.

3.21.3 All individuals notified per the requirements of this paragraph shall not read, examine, remove, or otherwise interfere with PHI. They shall not allow access to PHI, or disclose the contents of PHI, to any other person. All such individuals with knowledge of an unauthorized disclosure of PHI shall notify either an appropriate State official or a manager of the Contractor with responsibility for notifying the appropriate State official.

3.22 Records

3.22.1 The Contractor shall maintain documentation for all charges under this Contract. The books, records, and documents of the Contractor, insofar as they relate to work performed or money received under this contract, shall be maintained for a period of three (3) full years from the date of the final payment and shall be subject to audit at any reasonable time and upon reasonable notice by the State, the Comptroller of the Treasury, or their duly appointed representatives. The financial statements shall be prepared in accordance with generally accepted accounting principles.

11 INSURANCE

11.4.1 Delete first sentence and substitute:
The Contractor shall purchase from and maintain, with a company or companies licensed to do business in Tennessee by the Department of Commerce and Insurance, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum plus value of subsequent Contract modifications for the covered project at the site on a replacement cost basis.

11.4.1.1 Delete the last two sentences and substitute: Any deductibles shall be the responsibility of the Contractor.

11.4.1.2 Delete clause.

11.4.1.4 Delete the clause in its entirety and substitute: This property insurance shall cover portions of the work stored off the site and also portions of the work in transit. The Contractor shall present a certificate of insurance demonstrating coverage of the property stored off the site or in transit at the time payment for that portion of the work is presented.

11.4.2 At beginning of first sentence delete "The Owner shall purchase…" and substitute "The Contractor shall purchase…".

11.4.6 Substitute all references to "Owner" with "Contractor", and substitute all references to "Contractor" with "Owner".

11.4.8 Delete clause.

11.4.9 At the end of the paragraph delete "after notification of a change in the work in accordance with Article 7."

END

RENTENBACH
A CHRISTMAN COMPANY

Tennessee School for the Deaf High School Knoxville, TN

PROJECT SAFETY MANUAL

Tennessee School for the Deaf
New High School and Infrastructure Upgrades
Knoxville, TN

September 14, 2015

Statement of Safety Program

It is a fundamental value of Rentenbach that safety always is a primary consideration. It is our policy and a top priority to do all in our power to provide a safe work place for all workers and to mandate the use of good safety practices. Adherence to established safety standards and procedures is required of everyone at all times on the TSD New High School and Infrastructure Upgrades Project site.

There is no phase of the operation that has greater importance than accident prevention and the preservation of human resources.

This Project Specific Safety Program has been developed in support of these concepts to serve as a reference in assisting all project trade contractors in satisfying their responsibility "to provide a safe, healthful work place, free of recognized hazards."

Rentenbach Insert Name Project Superintendent	Rentenbach Insert Name Project Manager
Rentenbach Insert Name Vice President/Principal	Rentenbach Roger Smith Safety Director

Date: September 14, 2015

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I. Introduction

This Project Safety Manual provides an administrative structure within which Rentenbach and subcontractors present on the Project site shall provide for the safety and health of their employees and other individuals affected by their activities and for the protection of property. This Manual does not relieve subcontractors of any of their traditional or specific legal responsibilities with respect to occupational safety and health or the protection of property. Instead, this Manual provides for coordination among the various subcontractors' individual programs, monitoring of subcontractors' conformance with their individual programs, and the requirements of this Manual, initiation of corrective actions when nonconformances are identified, and documentation of safety related programs, meetings, and incidents. This Project Safety Manual for TSD New High School and Infrastructure Upgrades has been developed to assist all subcontractors working at the Project site in satisfying their responsibility to provide a safe and healthful work place, free of recognized hazards, for their employees.

All employees, subcontractors, trades people, and visitors are required to watch The Rentenbach Safety Orientation Video prior to performing work at the site. The video may be viewed at the site office.

Site Specific Hazards and/or Special Considerations:

1. High visibility safety vest, protective eyewear, and hard hats will be worn 100% of the time whenever on this project site. High-visibility t-shirts may be acceptable pending approval from Rentenbach site personnel.
2. This project will be next door to the existing TSD elementary, middle, and high schools, TSD Student Cottages, and neighboring houses. Extra precautions will need to be made and adhered to for the safety of everyone in and around the project site and throughout the TSD Campus and Island Home Neighborhood.
3. There will be absolutely no contact with any students for any reason without proper clearance and cooperation with the school. This includes recess, waiting or loading of buses, fire drills, etc. Those caught engaging in any contact with any children will be removed from the job site immediately and will not be able to return. ABSOLUTELY NO EXCEPTIONS!
4. Please notify someone with Rentenbach immediately if anyone outside of the job site personnel tries to enter the job site or directs you to do something. Treat these individuals with professional courtesy, without altercation or argument of any kind.
5. Due to the existing houses and neighbors, there will be no construction traffic other than on the routes designated in the Site Access Plan and Site Logistics Plan. Other routes of access require permission from Rentenbach and Tennessee School for the Deaf. Lewd and/ or rude behavior (cat-calling, cursing, etc…) will not be tolerated due to the proximity of the site and its surroundings. Professionalism will be expected from everyone that comes to this job site.
6. Please inform all subcontractor employees and delivery personnel that the project site is located at the end of Island Home Boulevard. Construction Traffic entering campus must follow the route established in the Site Access Plan. Please use extreme caution

when navigating the Island Home Neighborhood Area. Obey all posted speed limits and traffic signals and/or signage.

7. The Second Floor and Roof levels will require temporary fall protection measures while accessing and/or working on this level. Our company policy is 100% tie-off when exposed to falls over 6 foot, all trades people will be required to adhere to this policy. We intent to install temporary guardrails at these levels as soon as feasibly possible, however, regardless of the presence and/or condition of these temporary measure all trades people shall be utilize the proper fall protection equipment when accessing this area.
8. This project may have a standing seam metal roof or shingle roof with roof slopes that are not traversable without proper equipment. When accessing the roof area, proper fall protection equipment shall be utilized.
9. Watch for Overhead Hazards. This project has multiple floors and will be fast paced, therefore, it is very important that all trades people watch for overhead hazards and ensure that nobody is working in an unsafe location, such as within the swing zone of a crane.
10. Background checks will be required via the Tennessee Applicant Processing Service (TAPS) System.
11. Please note all requirements listed in Specification Section 01 35 13.22 – Special School's Project Procedures. (Also Listed as an Attachment to this Document)

All employees, subcontractors, trades people, and visitors are required to watch The Rentenbach Safety Orientation Video prior to performing work at the site. The video may be viewed at the site office.

II. Implementation Responsibility

Each and every person working at the Project site shall be responsible to be knowledgeable of the contents of this Manual and comply with every requirement contained herein.

III. Subcontractor Safety Programs

Each subcontractor is required to submit a copy of its written safety program to Rentenbach prior to commencing work at the Project site. Each program shall meet the requirements of the codes and regulations of OSHA, local and other authorities having jurisdiction over the work to be performed and shall include disciplinary procedures and safety orientation training procedures applicable to subcontractor personnel.

Each subcontractor safety program shall include, as a minimum, the following requirements:

A. Conduct weekly safety (Tool Box) meetings.

B. Monitor jobsite safety issues daily.

C. Conduct fire inspections.

D. Review hearing and eye protection requirements with employees.

E. Conduct tool and equipment inspections.

F. Review all personal protective equipment with employees.

G. Address fall protection measures.

H. Address Right-To-Know regulations, including Material Safety Data Sheets (MSDS')

I. Provide hazardous material awareness training.

IV. Discipline Policy

All Subcontractors entering onto this Project are required to comply with all aspects of the project safety program requirements. Those that do not adhere to this program will be subject to this discipline policy. The Project will utilize a three step process for minor infractions; repeat or major offenses of the safety program are subject to immediate removal from the Project.

1. Any re-entry employment programs for safety violations will be initiated only by the Rentenbach Superintendent and Project Manager.

2. Verbal warning - The verbal warning **shall be considered given** at the signing of the contract. This warning is to be communicated by the Subcontractor to **all** Subcontractor personnel prior to entering this Project.

3. Written warning - The second warning will be a written warning, documented, with a copy sent to the employee's Supervisor and Corporate Office.

4. A written warning, at the discretion of the Rentenbach Superintendent, can result in either removal from the Project or re-orientation of the safety program. The re-orientation will be attended by both the violator and his/her Foreman. This re-orientation may consist of:
    - Video training in the related area of the violation
    - Written verification by the employee that he/she is capable of identifying the hazards related to the violation.
    - The completion of a written Job Hazard Analysis by the employee and his Foreman for the task in which the violation occurred.

5. In addition, any Foreman that has had his/her crew members attend three (3) re-orientation sessions for any reason is subject to removal from the Project.

6. The third infraction of the same safety program issue will result in removal from the Project.

7. Any Foreman, General Foreman, or Superintendent who forces or directs any employee to violate a safety procedure, will be removed from the Project immediately.

8. Any violation deemed threatening to life, limb or major property damage will be grounds for immediate removal from the Project.

Subcontractors will comply with all provisions of Rentenbach's safety program. In the event of Subcontractor's noncompliance, the Subcontract may be canceled, terminated, or suspended, in whole or in part, and Rentenbach may complete the work at the cost of the Subcontractor in accordance with the Subcontract Agreement.

V. Weekly Safety Meetings

Rentenbach will hold weekly construction coordination/safety meetings. **All active, on-site subcontractors shall be represented at these meetings.** At the beginning of each meeting current safety topics, issues, concerns and problems will be discussed.

Each active, on-site subcontractor shall conduct weekly toolbox meetings. Every worker active on site shall attend. Each subcontractor shall furnish the following documentation to Rentenbach after each toolbox meeting: date, topic(s) discussed, names of attendees, subcontractor's name, and any safety concerns noted.

VI. Safety Inspections

Rentenbach's Project Superintendent will conduct informal inspections of conditions, practices and equipment on a daily basis. Rentenbach's Safety Director shall schedule visits to the Project site, unannounced, to inspect the work in progress. All safety discrepancies noted shall be reviewed with the Project Superintendent responsible to ensure that corrective measures are implemented.

Supervisors of all active on-site subcontractors are responsible to conduct daily inspections of conditions, practices, and equipment relating to their work areas/activities. Safety discrepancies discovered, along with the corrective measures taken, shall be reviewed with the Rentenbach Project Superintendent.

VII. Drug/ Substance Abuse Testing Program

A. **Any employee injured at the Project site and needing offsite medical attention will be tested for alcohol and drugs.** If the injured party was hurt by the action of another person who was not injured, this person must also submit to substance abuse testing. Additionally, any employee causing or contributing to a major incident not resulting in injury will be tested for alcohol and drugs. An employee who tests positive for illegal substances or alcohol will not be allowed to return to the project site. Any employee who refuses to submit to substance abuse testing will not be allowed to work at the project site.

B. It is the responsibility of the employer to make sure that the testing is performed at the time of the incident. It is also the responsibility of the employer to cover any costs incurred due to the testing. Results of the testing will be considered confidential. **An employee that is tested late (not within 8 hours of the incident) will be considered as "not tested" and will not be allowed to return to work on the project site.**

Notes:

1. Visitors and delivery personnel are not included.
2. The drug-screening test shall include testing for cannabinoids, depressants, dissociative anesthetics, hallucinogens, opioids and morphine derivatives, and stimulants. **Refer to Attachment I.**

VIII. Hazardous Material Control Program

Each subcontractor is responsible for the safe storage, use and disposal of any hazardous material required to perform their scope of work. Each subcontractor using such materials shall provide Rentenbach with a copy of their Hazardous Material Control Program before any of his material is delivered to the Project site. Each program shall, at a minimum, include the following:

A. Identification and classification of hazardous materials
B. Safety and health precautions
C. Training in safe storage, handling and use
D. Transporting, labeling, packaging, documenting and disposal requirements
E. Material Safety Data Sheets (MSDS) for all chemicals

Each subcontractor is to submit to Rentenbach a complete list of hazardous chemicals that may be used at the Project site along with a copy of a Material Safety Data Sheet (MSDS) for each. Copies of any subsequent MSDS amendments, additions, or corrections shall also be promptly submitted. Additionally, a list of the chemicals that are on site is to be submitted to Rentenbach.

Rentenbach will maintain a master file of all jobsite MSDS' for every subcontractor in the on-site Project office. This information will be made available to any employee upon request.

It is the responsibility of each subcontractor to provide proper and adequate employee training as required under this Act.

Compliance with the storage, use and disposal requirements as outlined on labels and MSDS's is mandatory for all users; full understanding of these requirements is expected of all users and suppliers of hazardous materials.

IX. Existing Hazardous Material

The Rentenbach Site Manager and / or Superintendent and Owner/Client shall review all areas of the Project site for existence of hazardous materials, such as asbestos and lead. If asbestos exists in areas that involve construction work, the Owner/Client shall arrange to remove the asbestos before any construction work takes place in each area.

If lead-based paint exists in areas, which involve construction work, each Subcontractor working in the areas shall be responsible for complying with the requirements of the OSHA standard for lead exposure. The recognition of possible contaminated areas is key to avoiding exposure. If you discover an area that you suspect lead may be present you are to bring it to the attention of the Rentenbach Project Superintendent.

Proper communication regarding the hazardous materials is to be conveyed to all people that may possibly be exposed to the hazard.

Remember - If a suspect hazardous material is discovered notify Rentenbach's Project Superintendent immediately.

X. Personal Protective Equipment and Clothing

Each subcontractor shall supply each of their workers with the proper safety equipment, take any necessary precautions to maintain the equipment according to current regulations and specifications and accept responsibility to assure that proper safety equipment is used when required. All workers shall be required to wear appropriate personal protective equipment and clothing where there is an exposure to hazardous conditions and where needed to reduce hazards to the worker. The following list represents the minimum requirements:

A. Outer Garments
Suitable outerwear is defined as clothing designed to protect from expected hazards. Outer garments should be well fitting. Short sleeve garments may be worn where no hazards to exposure exist. **Hi-Visibility Shirt or Vest is required 100% of the time when equipment requiring an operator is being operated on the site.** Tank tops or "muscle shirts" are not permitted. Full pants are to be worn. Neckties should not be worn when working around moving machinery. All employees are to avoid loose sleeves, frills or trims that could present hazards. Racist or profane slogans on outer garments are not permitted.

B. Gloves
Hands are to be protected as dictated by working conditions. Gloves, mittens or hand leathers will be of the type consistent with the hazards present.

C. Hardhats
Hardhats must be worn on site at all times. Acceptable hardhats must meet the requirements of ANSI Standard Z89.1 – Type 1 Class E.

D. Eye and Face Protection
1. Acceptable safety glasses must meet the requirements of the most current ANSI Standard Z87.1.

2. Employees shall be required to wear proper eye and face protection during operations where a hazard or risk of injury exists from flying objects or particles, harmful contacts, exposures such as glare, liquids, injurious radiation, electrical flash, or a combination of these hazards.
3. Contact lenses or US food and drug administration standard hardened lenses shall not be considered as eye protection.
4. An employee who needs corrective lenses in spectacles where eye protection is required shall be protected by one of the following:
   a. Spectacles whose protective lenses provide optical correction.
   b. Goggles that can be worn over the corrective lenses without disturbing the adjustment of the spectacles.
   c. Goggles that incorporate corrective lenses mounted behind the protective lenses.
5. Face and eye protection equipment shall be of proper size to fit the employee and protect against the intrusion of foreign objects. Face and eye protection shall be kept clean and in good repair. Equipment with structural or optical defects shall not be used.
6. Face shields and goggles shall be used, as required, to provide eye and face protection when safety glasses are insufficient.
7. Employees shall wear welding helmets with filter lenses when engaged in welding, cutting, or burning operations or the employee shall wear safety glasses with side shields or goggles under the shield when the shield is raised and is exposed to flying objects. Manufactured welding shields shall be placed around the work area to prevent flash exposure to other employees.

E. Jewelry

Bracelets, necklaces, rings and earrings are not to be worn during operations where they present hazards to the wearer.

F. Foot Protection

Work boots or approved safety shoes are to be worn at all times on the project. Special safety footwear for protection against exposure to electrical shock, chemicals, acids, caustics, and hot or molten materials may be required and it is the responsibility of the employer to provide their employees with the appropriate "special footwear" if it is deemed necessary. If an employee is using a Jack Hammer toe guards are required.

G. Personal Protective Equipment

The use of personal protective gear, such as gloves, respirators, coveralls, safety glasses, ear protection, and the like, will be required as conditions demand and shall be reviewed at the time of employee orientation or when assigning duties. The contractor is required to supply all required PPE to their employees.

H. Respirators

Any Subcontractor responsible to perform work that requires respiratory protection shall have a written respiratory program in place. A copy of the program shall be submitted to Rentenbach's Superintendent before commencement of any work activities that require the use of respirators. At a minimum, each respiratory protection program shall provide each employee with training relative to the need for use, fitting, fit testing, cleaning and storage of respirators.

I. Fall Protection

Policy: Fall protection shall be worn and used, 100% of the time, by all persons when there is exposure to a fall greater than six (6) feet unless other provisions such as guardrails, safety nets, or fall restraints have been provided. This includes, but is not limited to, steel erection (including connecting, bolting-up, decking, welding or any other steel erection activity), precast erection, roofing activities and masonry work including overhand laying operations.

Exceptions: The safe use of ladders up to twenty four (24) feet in length.

Unacceptable means of compliance: Safety monitors.

Example of an acceptable means of compliance: A warning barrier fifteen (15) feet from the potential fall hazard. The exception to this will be for roofers performing roofing activities. They will be allowed to move closer to the edge and establish their warning barrier at six (6) feet. Anyone required to cross the fifteen (15) foot or six (6) foot barrier line must comply with the fall protection policy. The barrier shall consist of ropes, chains or wires supported by stanchion posts erected as follows:

- The system shall be flagged at no more than six (6) foot intervals with a high-visibility material.
- The system shall be rigged and supported in such a way that its lowest point (including sag) is no less than thirty four (34) inches from the walking/ working surface and its highest point is no more than thirty nine (39) inches from the walking / working surface.
- After the system is erected, the stanchions shall be capable of resisting, without tipping over, a force of at least sixteen (16) pounds applied horizontally against the stanchion, thirty (30) inches above the walking / working surface, perpendicular to the warning line, and in the direction of the floor, roof or platform edge.
- The system line shall have a minimum tensile strength of 500 pounds and after being attached to the stanchions, shall be capable of supporting without breaking, the loads applied to the stanchions noted in the above item.
- The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

XI. Emergency Telephone Numbers

Emergency telephone numbers for the ambulance, hospital, fire department, and police shall be posted in each jobsite office at each phone. Each contractor shall furnish Rentenbach with the emergency contact phone numbers for all key project personnel (e.g. jobsite supervisors, project managers, foreman, etc.). Contact numbers shall include mobile home, pager and other phone numbers available and necessary to access key personnel in the event of a project emergency. Distribution of these numbers will be limited and considered confidential.

XII. First Aid

Each subcontractor shall provide Rentenbach with the name or names of each designated first-aid certified worker. Each subcontractor is required to have at least one (1) certified worker on site during periods when the subcontractor is active.

Rentenbach will have a first aid kit on site at the Project office. Each subcontractor shall also provide a first aid kit on site.

XIII. Injury/ Accident Reporting and Investigation

Any worker incurring an injury while working at the **TSD New High School and Infrastructure Upgrades** Project site shall report the injury to his supervisor immediately. **All injuries shall be verbally reported to Rentenbach the day of the incident/accident, followed up in writing on the proper forms, within twenty-four (24) hours.** Each incident/accident shall be documented using an accident investigation report similar to the Rentenbach report (refer to Attachment II). In the event of an accident, the following steps shall be taken:

A. Make sure that accident victim receives appropriate medical attention. This may involve calling paramedics, arranging transportation to a hospital, or sending victim to a clinic depending on severity of injury.
B. Notify Rentenbach's Superintendent immediately regardless of the seriousness of the incident or accident. This includes property damage.
C. Perform a thorough investigation of all facts and circumstances surrounding the accident. This should include:
    1. Photographs of the accident site and any other pertinent areas or conditions, which document the circumstances existing at the time of the accident.
    2. Determine who, if anyone witnessed the accident. Obtain names, addresses and phone numbers and get written statements from them as to what they saw and any other facts they may be aware of regarding the accident and its cause.
    3. Interview the accident victim to hear his/her explanation of how the accident occurred.
    4. Fully complete an accident investigation report and submit a copy to Rentenbach's Superintendent.

All accidents resulting in property damage shall be reported immediately to the Rentenbach Project Superintendent in order to allow for documentation of the extent of damage and determination of any required corrective action.

XIV. Assured Grounding Program

This program may be used to ensure that the scheduled inspection and safety condition of construction electrical equipment grounding conductors is satisfactory. The program applies to all extension cords and receptacles not part of the permanent building or structural wiring.

A. Inspection Procedure
The inspection procedure for all extension cords, attachment caps, plug/receptacle sets and equipment powered by a plug-in cord will include visual inspection at the beginning of each shift for signs of damage, defects, missing pins or insufficient insulation. Defective equipment will be removed from service until repaired and / or replaced.

B. Test Procedure
The test procedure for all extension cords and receptacles that are not permanent wiring includes testing for electrical conduction and correct attachment to the equipment ground conductor. The frequency of these tests will be as follows:

1. Prior to the first use.
2. Before equipment is returned to service following any repairs.
3. Before equipment is used following an incident which may have resulted in equipment damage.
4. At intervals not exceeding three months. Quarters and tape color should be coded following inspection. Winter (January through March) will be coded in white; Spring (April through June) will be coded in green; Summer (July through September) will be coded in red; and Fall (October through December) will be coded in brown.

Testing for each quarter is expected to occur between 15 days prior to and 15 days after the beginning of that quarter.

Each subcontractor is responsible for assigning a properly qualified person to coordinate their Assured Grounding Program and ensure compliance with this procedure and any other applicable codes and regulations.

Other forms of testing will be accepted as long as the record documentation of the testing can be provided upon request.

XV. General Jobsite Safety Rules

Violation of any of the following general jobsite safety rules is considered to be extremely serious and a detriment to the safety and welfare of all workers. Violation of these safety rules will be cause for disciplinary action up to and including permanent removal from the project.

A. Report all injuries to the field office. Get first aid promptly.
B. Keep your mind on your work at all times. No horseplay on the job.
C. Personal safety equipment must be worn as prescribed for each job, such as: safety glasses for eye protection when sawing or chipping concrete or masonry; hard hats at all times within the confines of the Project site; gloves when handling materials that are harmful to the skin; safety shoes for protection against foot injuries – no tennis shoes, sneakers, or other light duty shoes.
D. Keep your shirt on to prevent sunburn and to protect against acid burns, steam burns, weld splatter and cuts. Minimum clothing for upper body is a "T" shirt. Legs to be protected by long pants – no shorts allowed.
E. If any part of your body should come in contact with an acid or a caustic substance, rush to the nearest water available and flush over the affected part. Secure medical aid as soon as possible.
F. Watch where you are walking. Don't run.
G. The unauthorized use, sale, possession or distribution of alcohol, narcotics, drugs or controlled substances while working or working while under the influence of these substances is prohibited.
H. Do not distract the attention of fellow workers – to do so may cause injury.
I. Sanitation facilities are provided for your use. Use them.
J. Good housekeeping is a must. Keep your work area free from rubbish and debris. Keep materials, tools, and equipment in a neat and orderly fashion.
K. Do not use a compressor to blow dust or dirt from your clothes, hair, face, or hands.
L. Use a respirator when working on operations where dust or fumes are present.
M. Never work aloft if you are afraid to do so, are subject to dizzy spells, or if you are apt to be nervous or sick.
N. In case of injury to a fellow worker, go for help. Never move an injured person unless it is absolutely necessary – further injury may result. Keep the injured as comfortable as possible and utilize jobsite first aid supplies until medics arrive.
O. Know where firefighting equipment is located and learn how to use it.
P. Learn to lift correctly – with the legs, not the back. If a load is too heavy, GET HELP.
Q. Riding material hoists, crane ball, and sideboards or with your legs dangling over the ends or sides of trucks is not permitted.
R. Do not use power tools and equipment until you have been properly instructed in their use and operation. Be sure that all guards are in place. Do not remove, displace, damage, or destroy any safety device or safeguard furnished or provided for use on the job, nor interfere with the use thereof.
S. Rope off or barricade danger areas. Do not enter an area, which has been roped off or barricaded.
T. If you must work around backhoes, cranes, trucks, and dozers, make sure operators are aware of your presence. All mobile equipment must have backup alarms.
U. Never oil, lubricate or fuel equipment while it is running or in motion.

V. Trenches 4 ft. in depth must have a ladder and over 5 ft. must be shored or sloped as required. Keep out of trenches or cuts that have not been properly sloped or shored. Inspect trenches and banks daily. Backfill material must not be stored closer than two feet from top of bank.
W. Use the "four and one" rule when using a ladder – one foot of base for every four feet of height. Always secure the bottom of the ladder with cleats and/or safety feet. Lash off the top of the ladder to avoid shifting. Ladders must extend three feet above a landing for proper use. Defective ladders must be properly tagged and removed from service.
X. Erect scaffolds according to manufacturers' recommendations.
Y. Use only extension cords of the three prong type and protected with a GFCI.
Z. The use of fall protection with safety lines when working from unprotected high places is mandatory. Always keep your lines as tight as possible.
AA. Never throw anything "overboard". Someone may be passing below.
AB. Open fires are prohibited.
AC. Floor perimeter and floor openings shall be properly guarded at all times. Perimeter cabling must be flagged. All covers for floor openings must be secured and marked, "Hole Cover Do Not Remove". A "hole" means a gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface. Note – this includes mechanical and electrical sleeves.
AD. All personnel operating a manlift or forklift must be certified.
AE. No radios, MP3 players or personal listening devices are allowed on site.

XVI. Housekeeping

A clean work place is a safe work place. Every subcontractor and worker shall be responsible to adhere to the following housekeeping guidelines:

A. Pick up and dispose of trash and debris on a daily basis. A sufficient number of trash receptacles shall be provided and emptied with regularity.
B. **Work areas are to be kept clean, orderly and floors are to be swept daily.**
C. Leads, hoses, and extension cords shall be hung up with a nonconductive material, off all floors, stairways, and walkways.
D. Trash such as drinking cups, cans, and scraps from lunch are not to be thrown down, but disposed of properly in marked containers.
E. Materials, equipment, concrete forms, pipe, etc., are to be orderly stacked so as not to obstruct walkways, doors, stairways, ladders, other points of access or egress, etc.
F. Oil, grease, and other such liquid spills shall be cleaned up at the time of spill and are not to be left unattended.
G. Participation in mandatory cleanup programs if the project requires it.

XVII. Ancillary Safety Procedures

A. Lockout/Tagout – a procedure for cutting off all sources of energy or flow of medium to a piece of equipment or system. Refer to Attachment III.
B. Confined Space Entry – a procedure to assure that workers who perform work in a confined space are protected. Refer to Attachment IV.
C. Cranes – all cranes and cable (wire rope), rigged hoisting equipment shall have a current annual inspection by an accredited agency prior to working at this site. Contractors also are required to maintain a current annual inspection for the duration of the work. An accredited agency is a third party, which is recognized by the Department of Labor, Occupation Safety and Health Agency. A copy of the annual certification must be submitted to the respective general contractor immediately upon arrival on site. Rigging must be inspected and have required capacity tags.
D. Powder-Actuated Tool Operator – each powder-actuated tool operator will be certified in accordance with OSHA requirements. Operators will carry their certification card on their person while operating powder-actuated tools.
F. Hole Covers – Any contractor / trade that creates or exposes a hole or opening in a floor or wall is responsible to immediately protect the opening in accordance with OSHA regulations. At a minimum the hole is to be protected by barricades or a secured cover that is sufficient in strength to support any potential load that may be imposed. Additionally, anyone who removes a hole cover is responsible to protect the area while the exposure is present and to re-secure the cover or protection once the work is completed for that shift.

XVIII. Tobacco Use Protocol

Smoking and the use of all other tobacco products, is strictly prohibited within any enclosed area of construction. The use of any tobacco product will be permitted in designated areas only. Violation of this policy will be cause for disciplinary action up to and including permanent removal from the project.

XIX. Crane Inspections

Each crane used at the Project site shall have a current annual crane inspection report, which documents that the crane has been inspected within the current year in accordance with established OSHA standards.

XX. Visitor Policy

All visitors to the Project site must report to the Rentenbach Project Office upon arrival. All visitors shall comply with the policies and procedures of this Project Safety Manual while on site. Visitors are required to watch the Rentenbach safety orientation video and sign the visitor release form. Visitors not sufficiently familiar with the jobsite shall be accompanied at all times by employees familiar with the Project. Visitors must wear a hardhat, Hi-Visibility shirt or safety vest, and proper footwear at all times while on site. Other PPE such as safety glasses are

to be worn when the conditions warrant such protection. The contractor requesting approval of the visitor is responsible to issue the proper PPE that may be required.

XXI. Fire Prevention and Protection

A. Fire Prevention

1. Housekeeping
   Proper Housekeeping practices by all subcontractors will help to establish and maintain free and unobstructed egress from the project site. Housekeeping of the project is to be maintained by all subcontractors performing work on the site. It is each subcontractor's responsibility to report areas of the jobsite that present a likelihood of fire to the Rentenbach superintendent. Depending on the type of construction and the participation of the subcontractors in daily housekeeping efforts, Rentenbach may create and enforce a mandatory cleanup policy that will be adhered to by all subcontractors.

2. Storage of Flammable and Combustible Liquids

   A. General Requirements
      1. Only approved containers and portable tanks will be used for storage and handling of flammable and combustible liquids.
      2. Approved metal safety cans will be used for handling and use of flammable liquids in quantities greater than one gallon. Plastic containers are prohibited. Flammable liquid materials may be used and handled in original shipping containers.
      3. For storage, use and handling of flammable liquids in quantities of one gallon or less, only the original container or approved metal safety cans may be used.
      4. Flammable or combustible liquids are not to be stored in areas used for exits, stairways or other high-traffic areas.
      5. No storage of flammable or combustible materials is to occur on any roof.

   B. Indoor Storage

      1. No flammable materials may be stored inside.
      2. Materials, which will react with water and create a fire hazard, shall not be stored in the same room with flammable or combustible liquids.

   C. Outdoor Storage

      1. All storage areas are to be created as to prevent the contamination of surrounding areas in the event of a spill. Proper consideration is to be

given to the runoff of rainwater vs. the control of spilled or leaking materials.

2. Containers less than 60 gallons in size are to be placed in areas not to exceed a total of 1,100 gallons. Containers are to be separated by a five foot clearance and will not be nearer than 20 feet to a structure.
3. Portable tanks will not be nearer than 20 feet from any structure.

D. Gas and Oxygen Bottles

1. Full and/or partially used compressed gas cylinders must be attached to approved carts and turned off after each use.
2. All compressed gas cylinders regardless of content amount (full, partially full or empty), shall be properly stored and secured in the area designated by Rentenbach.
3. Valve protecting caps shall always be in place when cylinders are not connected for use.
4. When moving a cylinder, be sure to remove all gauges prior to the move. Be sure to use a rack when lifting a cylinder to and from upper elevations. Never move a cylinder by rolling it or by dropping it down to lower elevations.
5. Oxygen cylinders must be stored 20 feet away from fuel cylinders or separated by a solid 1- hour divider. Storage is considered as not being used within the next shift of work or 24 hour period, which is ever shorter. Oil and grease must be kept away from oxygen cylinders.
6. Compressed gas cylinders shall be legibly marked with the chemical or trade name of the gas. Marking shall be by stenciling, stamping, or labeling and shall not be readily removable.
7. All L.P.G. not connected for use <u>must</u> be properly stored in the designated area. NO EXCEPTIONS!

E. Temporary Heat

1. Temporary heaters must be installed and serviced by authorized technicians only.
2. Housekeeping in the area of the heater is extremely important and all subcontractors are responsible to insure that no materials are stored near the heater or in such a fashion that they may create a hazardous condition.
3. All temporary fuel burning heaters are to have functioning safety valves that will eliminate fuel flow in the event of flame outage.
4. If a heater is to operate for an extended period of time it must have a daily scheduled inspection to insure that it is operating correctly and that the area is clear of possible obstructions.

5. The Rentenbach superintendent may assign maintenance, operation, and inspection responsibilities to a subcontractor.
6. All subcontractors are responsible to notify Rentenbach immediately in the event of a malfunctioning heater or potential for a hazardous condition.

B. Fire Protection

1. A means of egress shall be established and maintained. Each subcontractor is responsible to notify Rentenbach if the means of egress is not obvious or if it is obstructed.

2. The rules for evacuation will be posted on the project bulletin board area adjacent to the other OSHA required postings at the jobsite office. If the location of the work is such that posting of the rules is not feasible, a copy of the rules and a map of the evacuation route (if applicable) will be given to each subcontractor working on the project. It is the responsibility of each subcontractor to make their employees aware of any such posted or otherwise conveyed rules, maps or procedures for the safe and orderly evacuation of the project.

3. Emergency phone numbers shall be posted next to each phone in the jobsite trailer or office.

4. Firefighting equipment shall be provided by the subcontractor for protection of their employees. In some cases Rentenbach may provide "common area" protection. Each subcontractor is to coordinate their efforts to comply with this rule with the Rentenbach superintendent. Defective equipment shall be immediately replaced and brought to the attention of the Rentenbach superintendent.

5. Fire walls and exit stairways required for the completed buildings are given construction priority. Fire doors with automatic closing devices shall be hung on openings as soon as practicable.

6. Retain existing fire separations in buildings undergoing alterations or demolition until operations necessitate their removal.

C. Employee Emergency Action Plan

Rentenbach's project superintendent shall be the person in command in the event of a fire or other emergency. It shall be his responsibility to oversee that employees are evacuated and the emergency response team is notified. The superintendent shall designate another employee as second in command. Fires and other emergencies shall be reported to the superintendent immediately. All employees are required to familiarize themselves with the evacuation plan for the site and with the designated contacts for emergency response team.

In the event of a fire or other emergency, employees shall evacuate the building through the nearest exit after determining it is safe to do so. Upon exit from the unsafe area, the employee should contact his superintendent and coordinate efforts to call the emergency response team (911). Each foreman or superintendent is responsible for a head count of their employees after evacuation. The Rentenbach superintendent is to be notified of any missing employees.

If critical operations must be conducted or continued within or near an unsafe area during a fire or other emergency and the superintendent deems that limited activity may continue in the area, the superintendent shall establish a plan to monitor those employees in the unsafe area as well as a way to quickly evacuate them should the conditions become worse. If monitoring and quick evacuation are not possible, the operations shall be abandoned until conditions improve.

All employees are responsible for the joint welfare of all other employees. During evacuation, ambulatory employees trained in first-aid/CPR are responsible to assess the conditions of non-ambulatory employees and assist in their evacuation. Employees who cannot be moved must be reported to the superintendent upon evacuation.

PROJECT SAFETY MANUAL

SUBCONTRACTOR AND TRADE CONTRACTOR ACKNOWLEDGEMENT

I hereby acknowledge receipt and comprehension of the policies and procedures set forth in this Manual and agree to comply with its directives.

In addition, I hereby agree to comply with any field or trade-related guidelines as they apply to the portion of work for which I have been contracted and will incorporate them into the ongoing safety effort. I also understand and agree to comply with any State and Federal OSHA and ANSI regulations, standards, codes and rules as they apply to my portion of the work.

_____
(Signed)

_____
(Print Name)

_____
(Title)

_____
(Company Name)

_____
(Date)

Please sign and fill out the information requested above and return to Rentenbach.

Drug Screening List

A. Any employee injured at the project site and needing offsite medical attention will be tested for alcohol and drugs. If the injured party was hurt by the action of another person who was not injured, this person must also submit to substance abuse testing. An employee who tests positive for illegal substances or alcohol will not be allowed to return to the project site. Any employee who refuses to submit to substance abuse testing after an injury/accident which involves offsite medical attention will not be allowed to work at the project site.

Notes:

a. All staff/trades working at the project site shall be subject to the provisions of this program. Visitors and delivery personnel are not included.

b. Substance abuse testing shall include the drugs listed in c (below) and alcohol.

c. The drug-screening test shall include testing for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, methadone, methaqualone, opiates, phencyclidine, and propoxyphene. Refer to the following listing, commonly referred as a Panel 10 Drug Screening:

DRUG GROUP	COMMON NAME	DRUG OR METABOLITE DETECTED
Amphetamines	Speed, Eve, Crystal	Amphetamines, Methamphetamines
Barbiturates	Secobarbital, Pentobarbital, Phenobarbital, Butabarbital	Diverse
Benzodiazepine	Valium, Librium	Oxazepam
Cannabinoids	Marijuana, Pot, Smoke, Weed, Mary Jane, Ganja	Delta-9-THC-9-COOH
Cocaine	Coke, Blow, Crack, Tool	Benzoylecgonine
Methadone	Methadone, Met	Methadone
Methaqualone	Quaalude, Ludes	Methaqualone
Opiates	Morphine, Codeine, Heroin, Horse	Codeine, Morphine
Phencyclidine	PCP, Angel Dust, Acid, Ecstasy	PCP
Propoxyphene	Darvon	Propoxyphene

RENTENBACH
A CHRISTMAN COMPANY

ATTACHMENT II

ACCIDENT INVESTIGATION REPORT

Employee Name _____ Date of Birth _____
Home Street Address _____ Male or Female _____
City, State, Zip _____ Date Hired _____
Home Phone _____ Date of Injury or Illness _____
Emergency Phone _____ Time Employee Began Work _____
Case # From Log _____ Time of Event _____

If a subcontractor on job, please fill out the following information:

Employer Name _____ Position _____
Work Comp Insurance _____ Policy # _____

Project Name & Location _____ Project # _____

Did injury result in a fatality? _____ Date of Death _____ Did injury result in lost time? ____ # of Days of Lost Time _ _____

Drug test given? _____ Did injured seek medical attention offsite? _____ Name of Physician _____
Name and address of facility _____
Was person treated in emergency room? _____ Was person hospitalized overnight as in-patient? _____

What was injured doing just before incident occurred? (Describe activity as well as tools or equipment used. Be specific.)

_____

_____

Describe the injury. (Be specific: cut, fracture, burn, strain, body part affected.)

_____

_____

_____

Describe events causing injury. (who, what, where, when, why, how)

_____

_____

_____

Identify unsafe acts, conditions, contributory factors, environmental conditions.

_____

_____

Witnesses to accident. (name, address, phone number)

_____

_____

Describe steps taken to prevent future accidents of this nature.

_____

_____

Severity Potential: _____ Major _____ Serious _____ Minor Have similar accidents occurred before? _____

_____ _____
Superintendent Signature & Date Injured Signature & Date

Date: September 14, 2015

Lockout/Tagout Procedure

Requirement

Whenever service, maintenance, or inspection is performed on machines, equipment, electrical circuits, or systems, it must be done with the machine, equipment, electrical circuit, or system stopped and isolated from all sources of energy or flow of medium. The energy isolation device(s) or isolation values for that machine, equipment, electrical circuits, or systems must be locked out and tagged out in accordance with a documented procedure. Employees involved in the energy control program must be given training. When subcontractor employees are performing work at the Project site, they must coordinate with Rentenbach and any other employer to ensue that no employees are endangered. When a group of employees is performing a service, maintenance, or inspection activity, each employee must be afforded protection equivalent to the utilization of individual lockout/tagout.

Lockout/Tagout Procedure

This procedure establishes the minimum requirements for the lockout/tagout of energy isolating devices and flow isolation values whenever maintenance, servicing, or inspection is done on machines, equipment, electrical circuits, or systems. It shall be used to ensure that the machine, equipment, electrical circuit, or system is isolated from all potentially hazardous energy sources or flows, and locked out before employees perform any servicing, maintenance, or inspection where the unexpected energization or startup of the machine, equipment, electrical circuit, or system or release of stored energy/flow could cause injury.

All subcontractors are required to comply with the restrictions and limitations imposed upon them during the use of this procedure. All employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine, piece of equipment, or system which is locked out to perform servicing, maintenance, or inspection, shall not attempt to start, energize, or use that machine, equipment, or system. Failure to follow this procedure will result in disciplinary action.

Sequence of Lockout

1. Notify all affected employees that servicing, maintenance, or inspection is required on a machine, equipment, electrical circuit, or system and that the machine, equipment, electrical circuit, or system must be shut down and locked out to perform the servicing, maintenance, or inspection.
2. The employee shall refer to any and all sources to identify the type and magnitude of the energy that the machine, equipment, or electrical circuit utilizes, shall understand the hazards of the energy, and shall know the methods to control energy. The type and source of medium which is flowing in a system to be worked on shall be identified and system isolation values located. All flows shall be stopped and the lines to be worked on purged prior to the commencement of work.

3. If the machine, equipment, or electrical circuit is operating, shut it down by normal stopping procedure (depress stop button, open switch, close valve, etc.).
4. Deactivate the energy isolation device(s) so that the machine, equipment, or electrical circuit is isolated form all energy sources. Close isolation values or shut down equipment which is used to provide flow to the system.
5. Lock out the energy isolation device(s) with assigned individual lock(s). Tagout isolation values and/or equipment.
6. Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verifying the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

   CAUTION: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.
8. The machine, equipment, electrical circuit, or system is now locked and/or tagged out. The employee(s) that installed a lock shall apply tag(s) identifying who locked the piece out, the date, and the time.

Restoring Equipment/System to Service

When the servicing, maintenance, or inspection is complete and the machine, equipment, electrical circuit, or system is ready to return to normal operating condition, the following steps shall be taken:

1. Check the machine, equipment, or electrical circuit and the immediate area around the machine, equipment, or electrical circuit to ensure that nonessential items have been removed and the machine, equipment, or electrical circuit components are operationally intact.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area.
3. Verify that the controls are in neutral.
4. Remove the lockout/tagout devices and re-energize the machine, equipment, or electrical circuit.
5. Notify affected employees that the servicing, maintenance, or inspection is complete and the machine, equipment, or electrical circuit is ready to use.

CONFINED SPACE ENTRY PROCEDURE

I. Definitions

A. Confined Space
Confined space means any space having a limited means of egress which is subject to the accumulation of toxic or flammable contaminants or has an oxygen-deficient atmosphere. Confined spaces include, but are not limited to: storage tanks, tunnels, pipelines and open top spaces such as pits, tubs, vaults, caissons and vessels.

B. Hazardous Atmosphere
Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (escape unaided from a permit space), and injury or illness from one or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL).
2. Airborne combustible dust at a concentration that meets or exceeds its LFL. Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five (5) feet or less.
3. Atmospheric oxygen concentration below 19.5% or above 23%.
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published as subpart "G", Occupational Health and Environmental Control, or in subpart "Z", Toxic and Hazardous Substances which could result in employee exposure in excess of its dose or Permissible Exposure Limit.
5. Any other atmospheric condition that is immediately dangerous to life or health.

II. Owner/Client's General Requirements

A. The owner/client shall evaluate the work place to determine if any spaces are permit-required workspaces.
B. If the work place contains permit spaces, danger signs shall be posted at all points of entry to each space. Example: Danger, Permit Required Confined Space, Do Not Enter.
C. Identify the elements, hazards, and previous experience with each space that make it a permit space.
D. Identify any implemented precautions and procedures used by the owner/client to protect his employees in or near each space.

III. Subcontractor Requirements

A. Each subcontractor shall obtain any available information regarding permit space hazards and entry operations from the owner/client and coordinate employee entry operations in or near permit spaces.
B. Each subcontractor who performs any work in permit required work spaces shall be responsible to follow the requirements of this confined space entry procedure. Each

subcontractor shall provide training for each employee involved with work located in permit required work spaces.

C. Subcontractors must provide documentation that training has been given. Said documentation shall contain each employee's name, ID of trainer, and dates of training. Subcontractor employee duties relative to this procedure are as follows:

1. Entry Supervisors Duties
    a. Identify the need to implement this procedure.
    b. Responsible to follow the procedure requirements.
    c. Complete safe entry checklist.
    d. Complete a confined space entry permit for each 8-hour period.
    e. Knows, understands and insures training of the authorized entrants and attendants.
    f. Checks appropriate permit information, assuring all tests have been made and recorded. Knows the hazards that may be faced during entry, including mode information, signs or symptoms, and exposure consequences.
    g. Terminates the permit if required.
    h. Verifies rescue services are available.
    i. Removes unauthorized individuals from the permit space.

2. Attendant Duties
    a. Knows the hazards that may be faced during entry, including mode information, signs or symptoms, and exposure consequences.
    b. Is aware of possible behavioral effects of hazard exposure of entrants.
    c. Continuously maintains a count and identification of who is in the permit space. Verifies that all entrants have exited the confined space at the end of the work shift.
    d. Remains outside the space until properly relieved by another attendant.
    e. Monitors activities inside and outside the space to determine if it is safe for entrants.
    f. If the attendant detects behavioral effects of hazard exposure, he/she must be knowledgeable to:
        i. Summon rescue and other emergency services.
        ii. Warn authorized entrants.
        iii. Perform non-entry rescues.
        iv. Perform no duties that might interfere with the primary duty to protect authorized entrants.

3. Authorized Entrant Duties
    a. Know the hazards that may be encountered.
    b. Know how to properly use protective and emergency equipment required.

c. Know how to communicate with attendant.

IV. Procedures

A. General

All employees required to enter into a confined space shall be instructed in:

1. The nature of the hazard involved.
2. The precautions required.
3. The use of personal protective equipment and emergency equipment required. No employee shall be permitted to enter a confined space unless the following steps have been completed:
    a. A tested ventilation system is in place to ensure the removal of harmful gases, vapors, smoke, fumes, mists or dusts from within the confined space.
    b. The employee has been provided with and is wearing appropriate respiratory protective equipment.
    c. Where presence of toxic gas is suspect, appropriate gas tests shall be performed immediately prior to entry to determine the presence of any harmful gases, fumes, mists, vapors, smoke, dusts or an oxygen deficiency. Re-testing shall be done at least every four (4) hour intervals. During the presence of employees in the confined space, to ensure harmful concentrations of gases, vapors, smoke fumes, mists or dusts or any oxygen deficiency has not developed, gas test results shall be taken and logged.

B. Environmental Testing

Before entry into any confined space suspected of having mixtures or concentrations of flammable and/or toxic air contaminants or oxygen deficiencies, appropriate tests of the atmosphere shall be made by a qualified person to assure that, explosive limits are less than 10% LEL, that toxic gas levels (TLVs) as specified by established health data sheets are not exceeded and that oxygen concentrations are greater than 19.5% but less than 23% of the total air mixture.

A confined space found to have or suspected of having oxygen deficiency or exceeding flammable or toxic limits shall be:

1. Reported promptly to the Rentenbach Supervisor on site.
2. Posted with the appropriate warning signs.
3. Ventilated or exhausted.
4. Re-checked by a qualified person prior to entry.

During inert gas welding, portable and/or fixed oxygen analyzers with visual/audible, alarms shall be provided in areas where oxygen deficient atmospheric conditions may

develop. Continuous oxygen monitors, equipped with alarms shall be provided in areas designated.

All monitoring and testing equipment shall be maintained in accordance with the manufacturer's specifications.

C. Personal Protective Equipment

Work and/or rescue equipment shall be immediately available at all times and shall be selected with the potential hazards or possible contingencies determining the equipment which may be required during the work operations.

Appropriate eye, face, and ear protection and the designated protective clothing shall be worn by employees exposed to physical hazards.

Where air sampling has determined that flammable or toxic limits have been exceeded or an oxygen deficiency exists and accepted engineering control measures such as general and local ventilation are not feasible, air supplying respiratory protection shall be worn.

Employees entering a confined space where a harmful or potentially harmful atmosphere exists, shall wear an approved safety harness attached to a life line which is attended at all times by another worker stationed outside the confined space entrance. The outside worker shall be equipped to be capable of immediately rescuing the worker in the confined space. A mechanical device shall be available to retrieve personnel from vertical spaces more than 5 feet deep.

When an employee enters a confined space from the top, the employee shall wear a safety harness, which will keep the individual in a vertical position if a rescue is required.

Where the work being performed requires more than one worker to enter the confined space, provisions shall be made to prevent safety lines or air hoses from becoming entangled.

Where air sampling has determined flammable or toxic limits have been exceeded or an oxygen deficiency exists, and acceptable engineering controls such as general or local ventilation is not feasible, appropriate respiratory protection for the identified hazards shall be worn.

D. Ventilation/ Exhaust

When ventilation is used as a control method in maintaining acceptable concentrations of flammable and toxic contaminants, this section will be used as a guide in the installation and operation of ventilation systems.

1. Ventilation/exhaust will be constructed, maintained and operated to ensure the required protection, by maintaining a volume and velocity of exhaust air sufficient to gather dusts, fumes, vapors or gases from the confined or enclosed space and to convey them to suitable points of safe disposal.
2. Periodic air sampling for flammable and toxic materials and oxygen deficiencies shall be performed before and during employee work assignments in the confined or enclosed space to ensure a safe environment is maintained.

E. Lighting/ Electrical

1. Lighting will be provided in areas where there is insufficient natural light.
2. For work areas that may contain concentrations that exceed safe limits of flammable or combustible materials, appropriate lighting systems such as explosion-proof fixtures, switches or equipment shall be used. All electrical equipment is to conform to article 500 of the National Electrical Code.
3. Emergency lighting shall be provided at all points of access and egress. When this is not practical, explosion-proof flashlights shall be provided to persons required to enter confined or enclosed spaces, which are subject to blackout.
4. In areas of high moisture, portable electric lighting shall be operated at a maximum of 12 volts.

F. Communications

Constant communications shall be maintained with all personnel in confined spaces by personnel outside those areas. This shall be accomplished by utilizing one or more of the following methods:

1. Visual surveillance
2. Voice communication
3. Telephone communication
4. Two-way radio communication

Note: Proper method(s) will vary depending on whether an explosive atmosphere exists.

G. Fire Protection

Fire protection shall be assured in confined spaces at all times. This shall be accomplished by adherence to the following:

1. Safe access and egress will be maintained at all times when work is being performed in a confined space. Access ladders, floors and components that are constructed out of combustible materials shall be protected, covered or wrapped with a flame-retardant material.
2. Flammable liquids (i.e. acetone, alcohol, etc.) must be stored in approved (UL or FM) flammable liquid containers or dispensers. The amount of such flammable

liquid(s) in a confined space shall not exceed the amount necessary to perform the work each day.

3. Properly rated fire extinguishers shall be immediately available. In instances where extreme fire potential exists, a charged fire hose shall be readily available for immediate use.
4. Cylinders containing oxygen, acetylene or other fuel gases shall not be taken into confined spaces.
5. All rags, brushes, wipes, gloves, etc. shall be stored in metal containers with lids.
6. A person shall be stationed during all welding, burning and heating operations to monitor for fires and to ensure that, during and after the work has ceased or at the end of a work shift, there are no fire conditions present. A thorough check of welding and cutting areas is to be made at the end of each welding operation to assure NO fires have been started.
7. All flammable gas equipment, hoses, torches, etc. shall be free of defects and are to be inspected prior to each use.
8. To eliminate the risk of fire in confined spaces because of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be shut off whenever the torch is left unattended for long periods of time. Fuel gas and oxygen hoses shall be immediately removed from confined spaces before they are disconnected from the torch or other gas-consuming device, and at the end of each work shift.

H. Lockout Procedure

All lines, pipes or other conveyance of flammable and/or toxic materials into a confined space shall be positively locked out and tagged in accordance with the Project Lockout/ Tagout Procedure.

I. Recordkeeping Requirements

1. A safe entry checklist (example attached) shall be completed and reviewed with the Rentenbach Supervisor on Site.
2. A properly executed confined space work permit (example attached) is to be obtained before work may begin in a confined or enclosed space. All entrances into the confined space shall be posted with a copy of the permit.
3. A file of sampling results will be kept for each confined space and will be maintained by the Rentenbach Supervisor on Site.

J. Rescue

Whenever work is to be performed in a confined space, emergency rescue must be anticipated and a rescue plan developed. In the event of an emergency, the Rentenbach Supervisor on Site will coordinate and work with emergency medical and rescue personnel. Rescue plans will encompass all foreseeable contingencies that might occur when working in confined spaces. The Rentenbach Supervisor on Site will be responsible for training employees in emergency procedures such as rescue and escape.

ATTACHMENT IV

DO NOT ENTER A CONFINED SPACE UNTIL YOU HAVE CONSIDERED EVERY QUESTION AND HAVE DETERMINED THE SPACE TO BE SAFE.

Description of confined space _____
Subcontractor involved _____ Date _____
Subcontractor Supervisor _____

YES	NO	
[ ]	[ ]	Is entry necessary?

TESTING

YES	NO	
[ ]	[ ]	Are the instruments used in atmospheric testing properly calibrated?
[ ]	[ ]	Was the atmosphere in the confined space tested?
[ ]	[ ]	Was oxygen at least 19.5% - not more than 23%?
[ ]	[ ]	Were toxic, flammable, or oxygen-displacing gases/vapors present?

- Hydrogen sulfide
- Carbon monoxide
- Methane
- Carbon dioxide
- Other (list) _____

MONITORING

YES	NO	
[ ]	[ ]	Will the atmosphere in the space be monitored while work is going on?
[ ]	[ ]	Continuously?
[ ]	[ ]	Periodically? (If yes, give interval:) _____

REMEMBER – ATMOSPHERIC CHANGES MAY OCCUR DUE TO THE WORK PROCEDURE OR THE PRODUCT STORED.

CLEANING

YES	NO	
[ ]	[ ]	Has the space been cleaned before entry is made?
[ ]	[ ]	Was the space steamed?
[ ]	[ ]	If so, was it allowed to cool?

VENTILATION

YES	NO	
[ ]	[ ]	Has the space been ventilated before entry?
[ ]	[ ]	Will ventilation be continued during entry?
[ ]	[ ]	Is the air intake for the ventilation system located in an area that is free of combustible dusts and vapors and toxic substances?
[ ]	[ ]	If atmosphere was found unacceptable and then ventilated, was it retested before entry?

ISOLATION

YES	NO	
[ ]	[ ]	Has the space been isolated from other systems?
[ ]	[ ]	Has electrical equipment been locked out?
[ ]	[ ]	Have disconnects been used where possible?

[ ] [ ] Has mechanical equipment been blocked, chocked, and disengaged where necessary?
[ ] [ ] Have lines under pressure been blanked and bled?

CLOTHING/ EQUIPMENT

YES NO
[ ] [ ] Is special clothing required (boots, chemical suits, glasses, etc.)? (If so, specify:) _____
[ ] [ ] Is special equipment required (e.g. rescue equipment, respirators, communications equipment, etc.)? (If so, specify:) _____
[ ] [ ] Are special tools required (e.g. spark-proof)? (If so, specify:) _____

RESPIRATORY PROTECTION

YES NO
[ ] [ ] Are MSHA/NIOSH-approved respirators of the type required available at the work site?
[ ] [ ] Is respiratory protection required (e.g. air purifying, supplied air, self-contained breathing apparatus, etc.)? (If so, specify type:) _____

TRAINING

YES NO
[ ] [ ] Have you been trained in proper use of a respirator?
[ ] [ ] Have you received first aid/CPR training?
[ ] [ ] Have you been trained in confined space entry and do you know what to look for?

STANDBY/RESCUE

YES NO
[ ] [ ] Will there be a standby person on the outside in constant visual or auditory communication with the person on the inside?
[ ] [ ] Will the standby person be able to see and/or hear the person inside at all times?
[ ] [ ] Has the standby person(s) been trained in rescue procedures?
[ ] [ ] Will safety lines and harness be required to remove a person?
[ ] [ ] Are rescue procedures available and can they be followed in the event of an emergency?
[ ] [ ] Are you familiar with emergency rescue procedures?
[ ] [ ] Do you know who to notify and what to do in the event of an emergency?

PERMIT

(This permit is an authorization in writing that states that the space has been tested by a qualified person, that the space is safe for entry; what precautions, equipment, etc. are required; and what work is to be done.)

YES NO
[ ] [ ] Has a confined space entry permit been issued?
[ ] [ ] Does the permit include a list of emergency telephone numbers?

REVIEWED: _____ DATE: _____
Rentenbach

RENTENBACH
A CHRISTMAN COMPANY

Confined Space Entry Permit
(Permit valid for 8 hours only)

Site Location and Description	Date:
	Time: AM/PM
Purpose of Entry	Expires: AM/PM
Name of Employer (Subcontractor)	

SUPERVISOR(S) IN CHARGE OF CREWS	TYPE OF CREW	PHONE NUMBER

Italic print areas denote minimum requirements to be completed and reviewed prior to entry

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
Lockout/De-Energize/Tryout			***Full Body Harness with "D" Ring***		
Line(s) Broken/Capped/Blanked			***Emergency Escape Retrieval***		
Purge/Flush/Vent			***Life Lines***		
Ventilation			Fire Extinguishers		
Secure Area (Post and Flag)			Lighting (Explosive Proof)		
Breathing Apparatus			Protective Clothing		
Resuscitator/Inhalator			Respirator(s) Air Purifying		
Standby/Safety Personnel			Burning and Welding Permit		

Note: Items that do not apply, enter N/A in the box. ***Record continuous monitoring results every 2 hours.**

CONTINUOUS MONITORING TEST(S) RESULTS:	PERMISSIBLE ENTRY LEVEL	TIME:	TIME:	TIME:	TIME:	TIME:	TIME:
Percent of Oxygen (O_2)	19.5% - 23.5%						
Lower Exposure Limit (LEL)	Under 10%						
Carbon Monoxide (CO_2)	+35 PPM						
Hydrogen Sulfide (H_2S)	+10 PPM						
Other							

NOTE: "+" denotes 8-hour time weighted average. Employee can work in area 8 hours (longer with appropriate respiratory protection).

ATTENDAT/GAS TESTERS	INSTRUMENT USED	MODEL AND/OR TYPE	SERIAL OR UNIT NO.

Attendant Standby Person is Required for all Confined Space Work

NAME OF CONFINED SPACE ENTRANTS(S)	NAME OF CONFINED SPACE ENTRANTS(S)

Supervisor Authorizing Entry: _____ Emergency Phone Number: _____

Reviewed by: _____
Rentenbach

EVACUATION PLAN

EVACUATE	**NON-EVACUATE**
Fire	Weather Conditions (Tornado)
Chemical Spills (interior)	Chemical Spills (exterior)
Earthquake	Civil Disorder
Bomb Threat	
Violence	
Bio Terrorism	

Designated Horn Signals

Stop Work Order- Repeated blasts of the Air Horn
Evacuation Order- Repeated two (2) pulse blast of the Air Horn
All Clear Order- Repeated three (3) pulse blast of the Air Horn

Non- Evacuate Plan

Repeated blasts from the air horn, work is stopped. Workers are to gather at their immediate location of work and report to their foreman for a head count.

Evacuation Plan

Upon enclosure of structure, emergency escape routes shall be posted for the exit ways. The procedure to be used for employee accountability after an emergency evacuation shall be as follows: Upon sounding of repeated two (2) pulse Air Horn blasts, all employees must immediately exit the building and report to their foreman, and assemble at the Southwest Corner of the Project Site.

All Clear

Repeated three (3) pulse blasts form the air horn signals that everything is all clear. Work may resume and/or workers may re-enter the building.

SECTION 01 21 13
ALLOWANCES

PART 1 - GENERAL

1.01 Include allowances stated in the Contract Documents in the Contract Sum. Designate in the construction progress schedule the delivery dates for products specified under each allowance.

1.02 Refer particularly to paragraph 3.8 of the Conditions of the Contract for inclusions and exclusions not specified below.

1.03 Administration of allowances

A. Contractor's duties in selection of products under allowances

1. Assist the Designer and Owner in determining qualified suppliers or installers.

2. Obtain bids from suppliers and installers when requested by the Designer.

3. Make appropriate recommendations for consideration of the Designer.

4. Notify the Designer promptly of:

a. Reasonable objections against a supplier, or party under consideration for installation.

b. Effect on the Construction Schedule anticipated by selections under consideration.

B. Adjustment of costs

1. Should the net cost be more or less than the specified amount of the allowance, the Contract Sum will be adjusted accordingly by Change Order or Construction Change Directive.

2. At Contract Close-out, reflect approved changes to the Contract Sum in the final application for payment.

1.04 Provide the following allowances:

1. Provide $25,000 allowance under bid category WC-27 for provision of plumbing upgrades to temporary kitchen at Middle School Multi-Purpose Room.

2. Provide $25,000 allowance under bid category WC-28 for provision of electrical service to temporary kitchen and mobile cooler/freezer.

END OF SECTION

SECTION 01 22 19
UNIT PRICES

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES administrative and procedural requirements applicable to unit prices either established in this Section or established in the Agreement based upon Owner's solicitation and Contractor's bid. Solicited unit prices are denoted in the "Definitions" Article below by having "(S)" as the Unit Price per Unit. Solicited unit prices are subject to determination at the time of a change in the Work if the bid unit price was not accepted and not listed in the Agreement. Unit prices may also be established and added to this Section by appropriate Modification.

B. RELATED SECTIONS are referenced in the definition of each unit price item.

C. ALLOWANCES: For each Unit Price item, an allowance is established in the Article "Definitions" as a Base Quantity included in the Work. If no Base Quantity is stipulated, or if the Base Quantity is zero, then the unit price is invalid.

D. UNIT PRICES include all direct and indirect costs, except overhead and profit, associated with the unit price item. If cumulative adjustments exceed, or are expected to exceed, a cumulative twenty-five percent (25%) of the Base Quantity (whether more than or less than), either party to the Contract may initiate renegotiation for a new unit price. Such a new unit price shall be made a part of the Contract by appropriate Modification, and will apply to adjustments that exceed a cumulative twenty-five percent (25%) of the Base Quantity and have not already been made.

E. INCREASES AND DECREASES in the Contract Sum by change order or construction change directive will be made based on the unit prices commensurate with either:

1. An interim increase or decrease in base quantities as agreed mutually or as deemed reasonably necessary by the Designer and consistent with actual quantities to date; or,

2. A final increase or decrease in base quantities to equal actual quantities when no further work defined as a unit price item is anticipated.

1.02 SUBMITTALS: Contractor shall keep a daily log of actual quantities of specified work units encountered, consumed, or expended. When submitting an application for payment that includes payment for Unit Price items, Contractor shall provide Designer a copy or report of the log that is acceptable to Designer. Actual quantities and the Contractor's log are subject to verification by Designer.

1.03 DEFINITIONS: For each Unit Price item, definitions are as follows:

Item	Related Sections	Base Quantity	Unit Price per Unit	Unit	Work Included
1	WC-02	-	-	$/CY	Remove and Replace Unsuitable Soils in Open Excavation
2	WC-02	-	-	$/CY	Remove and Replace Unsuitable Soils in Trench Excavation
3	WC-02	-	-	$/CY	Remove and Replace Rock in Open Excavation
4	WC-02	-	-	$/CY	Remove and Replace Rock in Trench Excavation
5	WC-02	-	-	$/CY	Provide #57 stone in lieu of suitable soils for Items 1-4
6	WC-02	-	-	$/CY	Provide flowable fill in lieu of suitable soils for Items 1-4
7	WC-26	-	-	$/CY	Remove and Replace Unsuitable Soils in Trench Excavation
8	WC-26	-	-	$/CY	Remove and Replace Rock in Trench Excavation
9	WC-27	-	-	$/Cy	Remove and Replace Unsuitable Soils in Trench Excavation
10	WC-27	-	-	$/CY	Remove and Replace Rock in Trench Excavation
11	WC-28	-	-	$/CY	Remove and Replace Unsuitable Soils in Trench Excavation
12	WC-28	-	-	$/CY	Remove and Replace Rock in Trench Excavation

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 - GENERAL

1.01 SECTION INCLUDES identification of each Alternate by number, and describes the basic changes to be incorporated into the Work if a particular alternate is made a part of the work by specific provisions in the Agreement between the Owner and the Contractor.

1.02 RELATED SECTIONS are referenced in the definition of each Alternate.

1.03 COORDINATION of related work and modifications to surrounding work as required to properly integrate each Alternate, and to provide the complete construction required by the Contract Documents, is the responsibility of the Contractor.

1.04 DESCRIPTION OF ALTERNATES:

Add Alternate #1 – Provide standing seam metal roof panels per specification Section 07 41 13 Metal Roof Panels at all locations called out to receive asphalt shingles. Refer to drawing A5.01 for locations of alternate.

Add Alternate #2 – Provide architectural cast stone veneer per specification Section 04 42 00 Exterior Stone Cladding at all locations to be Rockface Brick – Color #2 and Smooth Brick – Color #2. Refer to architectural elevations for cast stone veneer sizes and finishes corresponding to each size and finish of Brick – Color #2.

Add Alternate #3 – Provide automatic operators per specification Section 08 71 00 Door Hardware at doors 101A, 101B, 192A, 192C, D01A, and D01B. All Operators to be mounted to building walls adjacent to doors.

Add Alternate #4 – Provide Ground Source Heat Pump System in lieu of Water Source Heat Pump System.

END OF SECTION

SECTION 01 26 00
MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUPPORTING DOCUMENTATION for PROPOSALS or CLAIMS

A. Propose changes to Work in writing, specifically describing proposed change, or briefly describing the proposed change with specific reference to a completely descriptive attachment.

B. Propose changes in Contract Sum in writing, stating briefly the reason for change, and summarizing material, equipment, labor, overhead, and profit factors for Contractor, Subcontractors, and Sub-subcontractors. Unless waived by Owner, attach itemization of values of direct cost on form shown as Section 01 26 50, or similar form which provides same information, citing:

1. Materials: units, costs, quantities, totals;

2. Equipment: hours, rates, totals; and,

3. Labor: hours, rates, totals.

C. Propose changes in Contract Time in writing:

1. Fully describe the reasons for the change and effect of the change on the construction schedule, and attach a revised Progress Schedule; and/or,

2. **F**or a change based on weather-related delay, provide and attach weather data from National Oceanic and Atmospheric Administration (NOAA) as an impartial basis for determining justifiable extensions, or daily work logs which describe actual local weather conditions and impact, subject to approval by Designer. Provide and attach NOAA comparative data on normals, means, and extremes if not already provided in Project Manual.

1.02 FORM for CHANGE ORDERS and CONSTRUCTION CHANGE DIRECTIVES

The form shall be that shown as Section 01 26 40, or a similarly formatted document utilizing the same text. Complete description of change in Work shall be included in the body of the form or in referenced attachment. Change in Contract Sum and Contract Time shall be expressed in the body of the form.

1.03 SIGNATURES:

A. Form shall be signed by authorized representatives of each of the entities required by Conditions of the Contract.

B. Proposed Change Orders will be prepared by Owner or Designer and normally signed by both before being issued to Contractor. Contractor shall sign acceptable proposed Change Orders, or refuse to sign if in disagreement, then shall retain one (1) counterpart and return other counterparts to Designer.

END OF SECTION

SECTION 01 26 10
CM / GC – GMP CONTINGENCY AND OWNER RESERVE PROCEDURES

PART 1 - GENERAL

1.01 CM PROCEDURES for USE of CONTINGENCY FUNDS

A. AUTHORIZATION to USE CM CONTINGENCY FUNDS

The CM/GC may be requested to make a change to the work by the Designer where such work should be funded by the CM Construction Contingency Funds per paragraph 1.9.2 of the CM at Risk Scope of Services and Deliverables. Such a change must be documented in the same manner as a Change Order and must be authorized in writing by the Designer and Owner by a Field Order Document.

B. SUPPORTING DOCUMENTATION for USE of CM CONTINGENCY FUNDS

1. Propose application to use CM Contingency funds in writing, specifically describing the reason the use of the funds is justified with specific reference to the appropriate use as specified under paragraph 1.9.2 of the CM at Risk Scope of Services and Deliverables, and itemizing material, equipment and labor for CM/GC, Subcontractors, and Sub-Tier Contractors. Unless waived by Owner, each itemization of values of direct cost on form shown as 01 26 50, or similar form which provides same information, citing:

a. Materials: units, costs, quantities, totals;

b. Equipment: hours, rates, totals; and,

c. Labor: hours, rates, totals.

2. Propose changes in Contract Time will be initiated by Change Order.

C. FORM for USE of CM CONTINGENCY FUNDS

The form shall be that shown as Section 01 26 39, Form for Field Order, or a similarly formatted document utilizing the same text. Complete description of the reason for the use of the CM Contingency funds shall be included in the body of the form or in referenced attachment. Changes in GMP and/or Contract time shall use Section 01 26 40, Form for Amendment, Change Order, or Directive.

D. SIGNATURES

1. Form shall be signed by authorized representatives of each of the entities required by Conditions of the Contract.

2. Proposed CM Contingency fund usage forms will be prepared by Owner or Designer and normally signed by both before being issued to Contractor. Contractor shall sign acceptable proposed usage of CM Contingency funding form, then shall retain one (1) counterpart and return the other counterparts to Designer.

1.02 OWNER PROCEDURES for USE of OWNER RESERVE FUNDS

A. AUTHORIZATION to USE OWNER RESERVE FUNDS

The CM/GC may be requested to make a change to the work by the Designer where such work should be funded by the Owner Reserve Funds as funded per paragraph 2.2.1 of the CM at Risk Scope of Services and Deliverables. Such a use of Owner Reserve Funds must be documented in the same manner as a Change Order and must be authorized in writing by the Designer and Owner by a Field Order Document.

B. SUPPORTING DOCUMENTATION for USE OF OWNER RESERVE FUNDS

1. Propose changes to Owner Reserve Funds in writing, stating briefly the reason for the change, or briefly describing the proposed change with specific reference to a completely descriptive attachment.

2. Propose usages of the Owner Reserve Funds in writing, stating briefly the reason for the usage of the funds, and itemizing material, equipment and labor for CM/GC, Subcontractors, and Sub-Tier Contractors. Unless waived by Owner, each itemization of values of direct cost on form shown as 01 26 50, or similar form which provides same information, citing:

a. Materials: units, costs, quantities, totals;

b. Equipment: hours, rates, totals; and,

c. Labor: hours, rates, totals

3. Propose changes in Contract Time will be initiated by Change Order.

C. FORM for USE of OWNER RESERVE FUNDS

The form shall be that shown as Section 01 26 39, Form for Field Order, or a similarly formatted document utilizing the same text. Complete description of the reason for the use of the Owner Reserve funds shall be included in the body of the form or in referenced attachment. Changes in GMP and/or Contract time shall use Section 01 26 40, Form for Amendment, Change Order, or Directive.

D. SIGNATURES

1. Form shall be signed by authorized representatives of each of the entities required by Conditions of the Contract.

2. Proposed Owner Reserve Fund Field Orders will be prepared by Owner or Designer and normally signed by both before being issued to Contractor. Contractor shall sign acceptable proposed usage of Owner Reserve funding form, then shall retain one (1) counterpart and return the other counterparts to Designer.

END OF SECTION

SECTION 01 26 20
WEATHER DELAYS

PART 1 - GENERAL

1.01 EXTENSIONS OF CONTRACT TIME

If the basis exists for an extension of time in accordance with paragraph 8.3 of the Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. The Owner has reviewed weather data available from the National Oceanic and Atmospheric Administration (NOAA) and determined a Standard Baseline of average climatic range for the State of Tennessee.

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

C. Standard Baseline is as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12	11	8	7	7	6	7	5	4	5	6	11

1.03 ADVERSE WEATHER and WEATHER DELAY DAYS

A. Adverse Weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents construction activity exposed to weather conditions or access to the site:

1. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure;

2. Temperatures that do not rise above that required for the day's construction activity, if such temperature requirement is specified or accepted as standard industry practice; and/or,

3. Sustained wind in excess of twenty-five (25) m.p.h.

B. Adverse Weather may include, if appropriate, "dry-out" or "mud" days:

1. Resulting from precipitation days that occur beyond the standard baseline;

2. Only if there is a hindrance to site access or sitework and Contractor has taken all reasonable accommodations to avoid such hindrance; and,

3. At a rate no greater than one (1) make-up day for each day or consecutive days of precipitation beyond the standard baseline that total one (1) inch or more, liquid measure, unless specifically recommended otherwise by the Designer.

C. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor's scheduled work day and critical path construction activities were included in the day's schedule, including a weekend day or holiday if Contractor has scheduled construction activity that day.

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

Hence, Contractor should allow for an appropriate number of additional days associated with the Standard Baseline days in which such applicable construction activities are expected to be prevented and suspended.

1.04 DOCUMENTATION and SUBMITTALS

A. Submit daily jobsite work logs showing which and to what extent critical path construction activities have been affected by weather on a monthly basis.

B. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather station or other independently verified source approved by Designer at beginning of project.

C. Use Standard Baseline data provided in this Section when documenting actual delays due to weather in excess of the average climatic range.

D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for Claims established in paragraph 4.3 of the Conditions.

E. If an extension of the Contract Time is appropriate, such extension shall be made in accordance with the provisions of Article 7 of the Conditions, and the applicable General Requirements.

END OF SECTION

SECTION 01 26 39
FORM FOR FIELD ORDER

☐ **Request to Use CM Contingency Funds**

☐ **Request to Use Owner Reserve Funds**

Field Order No. _____

Project Name:
Project Location:

SBC Project No.:

Description of Usage:

Justification of Usage:

The original Sum of the (*CM Contingency/ Owner Reserve*) Fund:	**$**
Net Usage previously authorized:	**$**
The Sum of the Fund prior to this Usage:	**$**
This modification (*increases* / *decreases* / *does not change)* the Fund:	**$**

This modification does not change Contract Time. If a change in time is required it shall be accomplished by Change Order

CONTRACTOR: The costs associated with the usage of these funds must be submitted on Form 01 26 50, Form for Contractor's Subcontractor's Cost Itemization.

DESIGNER: Shall verify that proposed price and need for Fund Usage are in the best interest of the Owner to have the work accomplished.

OWNER: Has verified proposed pricing and Shall verify proposed pricing and agrees to the usage of these Funds as being in the best interest to the Owner and verifies that adequate funds are available to pay the cost for the accomplished work.

Contractor	Designer	Owner
signed _____	signed _____	signed _____
name _____	name _____	name _____
title _____	title _____	title _____
for _____	for _____	for _____

Additional Owner signatures (as required):

signed _____	signed _____	signed _____
name _____	name _____	name _____
title _____	title _____	title _____
for _____	for _____	for _____

SECTION 01 26 40
FORM FOR AMENDMENT, CHANGE ORDER, OR DIRECTIVE

☐ **Amendment**
☐ **Change Order** **> Number** _____
☐ **Construction Change Directive** _____

Project:

Original Contract Date: _____

This Change initiated: _____

The following changes in the Contract are hereby directed:

The original Contract Sum	**$**
Net Change previously authorized	**$**
The Contract Sum prior to this Modification	**$**
This modification (*increases*/*does not change*/*decreases)* the Contract Sum	**$**
The new Contract sum, including this modification	**$**
This modification (increases/*does not change*/*decreases)* the Contract Time	
The new Contract Time, including this modification	
The last day of the Contract Time, including this modification	

Contractor	**Designer**	**Owner**
signed _____	signed _____	signed _____
name _____	name _____	name _____
title _____	title _____	title _____
for _____	for _____	for _____

Additional Owner signatures (as required):

signed _____	signed _____	signed _____
name _____	name _____	name _____
title _____	title _____	title _____
for _____	for _____	for _____

SECTION 01 26 50
FORM FOR CONTRACTOR'S OR SUBCONTRACTOR'S COST ITEMIZATION

Materials, Equipment, and Labor itemized below will be provided by:	
Job Name:	Date itemized:
Project Number:	Proposal Request Number:

Description	Material				Equipment			Labor		
	Unit	Cost	Quantity	Total	Hours	Rate/hour	Total	Hours	Rate/hour	Total
Sub-Totals										
Total										

SECTION 01 29 73
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 FORM and APPROVAL

A. The form for schedule of values shall be AIA Document G703 Continuation Sheet.

B. If objected to by Designer, revise and resubmit to Designer's satisfaction prior to submitting application for payment.

1.02 ALLOCATION OF VALUES

A. If the Work is divided into defined portions ("Phases"), intended to have distinct commencement, duration, or completion requirements, divide the allocation to correspond to the Phases, then within each Phase, subdivide the allocations as specified in the following paragraphs.

B. Provide a single line item to account for mobilization and general administration, and fulfilling General Requirements.

C. If sitework is included, other than minor sitework incidental to a building or major structure, include sitework in single heading. Subdivide site utilities, roads and parking, and appurtenances according to general type within this division of construction activity.

D. For each involved building or major structure, provide a separate group of line items corresponding to Divisions and Sections of the Specifications. Further subdivide as desired, but maintain a distinct and identifiable correspondence to this allocation.

E. Account for Unit Prices and Allowances with a line item for each, until incorporating each into the appropriate allocations for the final statement of accounting.

F. Account for Modifications with a line item for each, until incorporating each into the appropriate allocations for the final statement of accounting.

END OF SECTION

SECTION 01 29 76
PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS FOR ALL APPLICATIONS

A. FORM:

1. Use AIA Document G702 Application and Certificate for Payment.

2. Use AIA Document G703 Continuation Sheet itemized with the line items and values of the Schedule of Values accepted by the Designer, and values and percentages for each line item.

B. SUBMITTAL: Submit the original and six (6) copies of each application to the Designer, with required attachments and accompanying submittals, in accordance with other applicable articles of this Section.

1.02 APPLICATION FOR PROGRESS PAYMENT

A. STORED MATERIALS

1. Materials stored on-site but not yet incorporated into the Work may be claimed for payment.

2. Materials suitably stored off-site may be claimed for payment provided that the following is attached to each copy of application:

a. A statement identifying where materials are stored, and that materials are tagged to identify them for use in the project;

b. Copies of bills of sale for materials claimed; and,

c. A certificate of insurance covering materials claimed, recognizing Owner's right to make claims.

1.02 ATTACHMENTS AND ACCOMPANYING SUBMITTALS

A. Attach the following to each copy of each application:

1. Continuation sheets,

2. Consent of Surety if applicable for reduction in retainage, and

3. Documents required for materials stored off-site.

B. Submit three (3) copies of the following with application:

1. Visitor Log for the period covered by application;

2. Progress Schedule, updated and current, indicating progress through the period covered by application and scheduled progress through completion of Work;

3. Submittal Log for entire project through the period covered by application, if required;

4. Payroll Transmittal letter(s) to Tennessee Department of Labor & Workforce Development for payrolls sent since last application, applicable; and,

5. Personnel Used in Contract Performance Attestation, exhibited as Section 01 29 76.13.

1.03 APPLICATION FOR PAYMENT AFTER SUBSTANTIAL COMPLETION

A. After Designer has certified that the Work is Substantially Complete, Contractor shall submit application for payment, including appropriate reduction in retainage, with the following attachments:

1. Continuation sheets described in 1.01 A.2;

2. Consent of Surety to Reduction in Retainage, using AIA Document G707A or a similarly formed letter, with the original of the Consent attached to the original of the application, and a copy of the consent attached to each copy of the application; and,

3. Documents required for materials stored off-site, if applicable, in accordance with 1.02 A.

B. In order to reduce retainage below the amount corresponding to Substantial Completion, Contractor shall have completed the prerequisites to Final Payment specified in the Section on Contract Close-Out and below.

1.04 APPLICATION FOR FINAL PAYMENT

A. When Designer has certified that the Work and needed modifications to the Contract are complete, Contractor shall submit a final application for payment.

B. Submit with the following attachments:

1. Final Continuation sheets described in 1.01 A.2;

2. Contractor's Affidavit of Payment of Debts and Claims, using AIA Document G706;

3. Consent of Surety Company to Final Payment, using AIA Document G707 or a similarly formed letter, with the original of the Consent attached to the original of the application, and a copy of the consent attached to each copy of the application. If Contractor has listed exceptions in the G706 form, Surety's consent shall acknowledge such exceptions;

4. A certificate of insurance to the effect of that required by 9.10.2 (2) of the Conditions of the Contract;

5. A written statement to the effect of that required by 9.10.2 (3) of the Conditions of the Contract;

6. A final accounting of the Contract Sum that appropriately allocates the entire Contract Sum to the Divisions of the Specifications. This may follow the same format as the Schedule of Values;

7. Subcontractors and Material Suppliers List, exhibited as Section 01 78 88; and,

8. (When Applicable) Provide Section 01 78 36 Roofing System Warranty, completed, signed and dated by the Roofing System Manufacturer.

1.05 APPROVAL AND PAYMENT

A. Designer, if in disagreement with the amounts claimed in an application, may either return application to Contractor for revision and resubmittal, or revise application by hand to indicate corrections Designer considers appropriate.

B. Designer, finding an application complete and correct, will certify the application and forward one copy to Contractor to indicate the action taken.

END OF SECTION

SECTION 01 29 76.13
PERSONNEL USED IN CONTRACT PERFORMANCE

PART 1 - GENERAL

1.01 ATTESTATION

Contractor shall submit a completed and signed copy of this form with each Application for Payment during the period of this Contract.

Project Title & Number:	
Contractor Legal Entity Name:	
Federal Employer Identification Number (or Social Security Number)	

The Contractor, identified above, does hereby attest, certify, warrant, and assure that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant in the performance of this Contract.

Signature _____ Date _____

Name _____ Title _____

NOTICE: An individual empowered to contractually bind the Contractor MUST sign this attestation. If said individual is not the chief executive or president, this document shall attach evidence showing the individual's authority to contractually bind the Contractor.

END OF SECTION

01 31 13.23 DESIGN COORDINATION / BUILDING INFORMATION MODELING

1.1 Executive Summary

a. This document, MEP Spatial Coordination Requirements for Building Information Modeling, will provide guidance to companies and individuals involved in 3-Dimensional MEP (Mechanical, Electrical, Plumbing, and Fire Protection) spatial coordination of installation. It is not a replacement for any other more project specific scope of work or contract. No single document can convey every aspect required to complete a BIM project; therefore, the primary focus of this document is to outline the MEP spatial coordination process using 3D and BIM technology.

b. If a question of "who should do what" arises, the team member with the highest risk and most to gain should perform the task. In most cases, the trade contractor responsible for installing the work should also be responsible for accurately depicting it in the 3D model.

c. All Coordination efforts shall comply with the most current version of the State of Tennessee Office of the State Architect (TN OSA) Building Information Modeling (BIM) Requirements available at http://tn.gov/finance/article/fa-osa-bim-standards. This document is effectively an addendum to those requirements. Accordingly, the following disciplines must produce BIMs:

i. Architectural

ii. Structural

iii. Mechanical

iv. Plumbing

v. Electrical

vi. Civil (3D geometry)

vii. Landscape (3D geometry)

viii. Communications

ix. Fire Protection

1.2 Collaboration, Design Modifications and Cost Changes

a. BIM is a tool to collaboratively adjust the designs detailed in the contract documents such that they are installed per best practices, industry standards, and for the best use of space for the Owner. The process reviews nearly every MEP system installed and as a result, design changes and modifications typically resolved in the field are now more visible to the entire project team. This apparent increase in design changes will not be justification or the basis for cost claims for every change in duct/pipe size, increased quantities of transition fittings, increased gauge of duct/pipe thickness, electrical pull boxes, etc.

b. Contractors are provided all documents at bid and are responsible for translating the construction documents into installed work. Pipe and duct sizes are typically shown as preferred sizes for optimal flow to meet the designed volume or rate; however, additional

bends, elbows, transitions, slimmer recessed light fixtures and different duct sizes must be anticipated and included in the base bid.

c. Each member of the spatial coordination team is responsible for identifying any design revision that they interpret as a cost change immediately during the meeting so the best solution at the least cost can be investigated.

d. A written summary budget of all cost claims (if any) for a fully coordinated area/floor must be submitted in writing by each trade contractor with their sign-off drawings. If a design change on this summary is accepted by the AE, CM and Owner, the contractor has additional time to provide a detailed quote for the work. Unless otherwise specified, this detailed cost claim is due with five business days of acceptance of the budgeted value.

e. Moving equipment requiring regular service access from an accessible ceiling system to a hard ceiling requiring an access panel shall be avoided unless no other opportunity exists. Equipment shall be coordinated and installed such that total access panel quantity is minimized.

1.3 MEP Spatial Coordination Team

a. Each subcontractor shall provide the necessary qualified staff to generate their 3D coordination models and subsequent drawings extracted from those models. All personnel shall have previous experience, and will be assigned to the job dedicated solely for the coordination modeling process. Field Personnel assigned to the job, such as Superintendents or Foreman actively running this project will not be acceptable for this position, however they should be consulted when needed. Contractors at the Pre-Award Meeting shall submit the name(s) or personnel who will be assigned to perform this work along with a brief description of their 3D modeling experience and the specific modeling software that will be used for the project.

b. If the subcontractor does not have the qualified in-house staff to generate their 3D coordination models and are using a third party consultant, that consultant must be approved by CM/GC prior to the subcontractor awarding their modeling scope of work. The subcontractor will provide a competent person from their company capable of making decisions on their scope of work, along with their consultant modeler, at each coordination meeting. The consultant will be considered an employee of the subcontractor and be held to the same standards as the rest of the project teams in-house modeling staff.

c. Minimum Qualifications: Individual participants in the MEP Spatial Coordination Team should have verifiable experience in at least two fully coordinated 3D projects where the MEP team spatially coordinated a 3D construction model. Participating companies should have adequate infrastructure and qualified competent personnel before onset of coordination.

d. All MEP trades must fully participate in the coordination process. Success requires that the CM and all of the MEP trade contractors are fully committed throughout the entire process. Any contractor who fails to comply with the agreed upon coordination schedule will bear the costs incurred by others.

e. The Design Team will provide electronic files of the current contract drawings to the MEP Spatial Coordination Team if available. The CM will distribute the files provided by

the Design Team and will use the model files to create CAD backgrounds for trade contractors and other support files necessary to complete project coordination.

f. Project Coordination Manager – Construction Manager's Representative

i. The Construction Manager (CM) will administrate the MEP Spatial Coordination Team and ensure trade contractor participation and performance in all coordination efforts.

ii. The CM will obtain and convey to the MEP Spatial Coordination Team all structural and architectural features that are required to complete the MEP spatial coordination. Specifically, the CM will manage the timely distribution of architectural, structural, and MEP electronic data and hard copy drawings between the Design Team (Project Architect, Mechanical Engineer, Plumbing Engineer, Electrical Engineer, etc.) and the MEP Spatial Coordination Team and maintain current logs.

iii. The CM will act as liaison between the MEP Spatial Coordination Team, the owner, and designers to ensure that all parties are aware of design changes or spatial issues requiring design input for resolution.

iv. Design changes that affect the MEP systems or spatial issues requiring resolution by the Design Team but not conveyed to the MEP Spatial Coordination Team in a timely fashion may adversely affect the coordination and construction schedules and impact cost.

v. The CM will lead MEP Spatial Coordination Team in partnership with the Mechanical, Electrical, Plumbing, Fire Protection contractors, including but not limited to, conducting the spatial coordination meetings, facilitating the drawing/model updates, maintaining the collaborative workspace, and facilitating meeting participation for local and remote participants.

vi. The CM will host recurring coordination meetings. Attendance is mandatory by all MEP Spatial Coordination Team members to maintain the coordination and construction schedules. Traditionally, it takes approximately 4 weeks to fully coordinate a 20,000 square foot floor or area. This target timeframe is dependent on all trades fully modeling their work prior to the first coordination meeting of each respective area.

1.4 Project Coordination Schedule

a. The Construction Manager will prepare and maintain a mutually agreed upon spatial coordination schedule with coordination drawing submittal milestones that meet the overall project construction schedule. At the MEP Coordination Kick-off Meeting the team will discuss the specifics of the coordination effort. A realistic and mutually agreed upon preconstruction coordination schedule created by the CM with input from all trade contractors participating in the coordination is imperative to success. Coordinating drawing development, coordination drawing submittal and review by the Design Team, fabrication duration, and delivery lead times will be included to support the project construction schedule.

b. All materials and equipment specified to be modeled must be fully modeled for each area prior to the first coordination meeting focusing on that area. The coordination meeting schedule only addresses the time required for the coordination of the work; contractors are responsible for adequately staffing the project to model their work ahead of the meeting schedule.

c. Typically, multiple floors and/or areas are coordinated concurrently to maintain schedule. Each contractor is required to provide adequate staff to model base bid design(s) and provide coordination modifications as dictated by the project schedule.

1.5 File Transfer and Collaboration Workspace

a. The CM will establish and host a web-based electronic workspace for the purpose of efficient and timely transfer of coordination files. The workspace will provide a collaborative location where the current contract CAD drawings, coordination CAD drawings, and fully coordinated submittal drawing files will reside. Each MEP Spatial Coordination team member obtains data from this location. MEP Spatial Coordination Team members are to upload updated copies of their coordination files, provide notification, and make collaboration comments/annotations as often as necessary to maintain the coordination schedule. The Construction Manager may use the MEP spatial collaboration workspace as an interface for collaboration between the Owner, Design Team, and other trades not actively involved in the MEP spatial coordination process.

b. The web-based electronic workspace for this project is located at: http://projects.christmanco.com/TSD

1.6 File Format, Compatibility, and Completeness

a. All MEPFP Equipment, Sheet Metal Ductwork, Mechanical Piping, BAS Controls, Plumbing, Process Piping, Electrical, Low Voltage, Fire Protection, Conveyance Equipment, Miscellaneous Metal, above ceiling Lab Equipment Supports, and Steel Fabrication Contractors will be required to provide at minimum; 3D solid models for the coordination process.

b. All team members must produce coordination models in a format compatible with Navisworks Manage 2015.

i. Each subcontractor must provide, and have the ability to read, 3D solid model files in at least one of the following formats DWG, NWD, NWC, DWF, DWFx, IFC, DGN; other formats will need to be tested before being accepted. CM/GC reserves the right to dictate the file type provided depending on software version, file size, viewing issues, etc. All files must be created as ACIS solids, polymesh models will not be acceptable.

ii. If NWC format is used, the file must be exported such that the objects are not divided by associated level within each file.

iii. Subcontractors shall inform CM/GC of any object enablers, software plugins, 3D viewers, etc., required for CM/GC to view their 3D models with the latest version

of Navisworks. The subcontractor is responsible for uploading these specific object enablers to the project File Sharing site.

c. All subcontractors must georeferenced their model files as defined by the coomon georeferenced point found in Architectural and Design models.

d. All base models shall be modeled to a level of detail equal to or greater than typical shown on a 2D plan, section or elevation drawn at 1/4" = 1'-0". Detailed models for specific areas of the project may require greater level of detail. The Model working units shall be feet/inches.

e. Each MEP Coordination Team member is to draw all of the major components of their work to scale, at elevation, and free from interference with the structure, their own components, and other MEP trades' work.

f. All trades are required to locate their vertical systems within wall cavities.

g. Supports, hangers, seismic restraints, insulation, structural zones of influence, serviceability access, and maintenance clearances shall be included.

h. All equipment must be labeled to correspond to the designation on the contract drawings.

i. Include required code and maintenance clearances and pipe/duct insulation shown in a separate layer.

j. All trades will be required to use elevation tags on each of their systems to show the distance above finish floor for ease of reference.

k. Model scope with the best information available, as applicable, to meet the coordination schedule. This may include modeling equipment that is not yet approved, but shall be based upon the anticipated submittal package or generic objects. Update the model as necessary after the submittals are approved to accurately represent the geometric and data associated with the applicable product.

l. The Mechanical Contractor is required to model and provide BIM services for previously bid mechanical equipment, geothermal systems, and site utilities (mechanical and plumbing systems).

m. The Electrical Contractor is required to model and provide BIM services for previously bid electrical equipment and site utilities (electrical systems).

n. The Mechanical Contractor is required to model and coordinate all Temperature Control System (TCS) panels.

o. Provide recurring file uploads using consistent export settings, viewpoints, parameters, scope, etc. per the standard naming convention.

p. Major Components

    i. HVAC

        1. At a minimum, all ducts and air handling equipment shall be modeled to the outside face dimension including flanges, joints, fittings, connections, insulation, offset requirements, access zones, control panels, diffusers and

grills, associated piping (to outside diameter of pipe or insulation, whichever is greater), any electrical work, and large hangers and supports associated with the HVAC system. Control cables outside the cable tray and wire management hooks are not required to be modeled unless the area is significantly congested as determined by CM/GC. Equipment (with pads) will be modeled to overall height, width, and depth with clearance and maintenance access zones per equipment specs, building code, or Owner requirement.

ii. Plumbing and Mechanical Piping

1. At a minimum all plumbing, piping, equipment (with pads), hangers, supports, and piping connections will be modeled to its overall height, width, and depth; including access zones for valves and cleanouts. Pipes will be modeled to the outside diameter of the pipe including fittings and connections adding insulation as its own entity where applicable. Plumbing feeding fixtures such as sinks, toilets, drinking fountains, floor and roof drains shall be modeled to rough in location.

iii. Fire Protection

1. At a minimum, all components of the fire protection system shall be modeled including all piping, valves, valve cabinets, fire pumps (with pads), sprinkler heads, hangers, supports, clearances & access zones, and control panels.

iv. Electrical

1. At a minimum, all panels and devices (including access zones as required by the local AHJ), light fixtures (with installation clearances), cable trays (with clearance above and to at least 1 side per Owner requirements), conduit ¾" and larger, hangers, busways, power feeds to the equipment, and switchgear will be modeled. Large groups of conduit less than ¾" will be modeled to reflect the overall space requirements. Generator system (if applicable) will only be modeled if an area is significantly congested as determined by CM/GC.

v. Fire Alarm

1. At a minimum, all components of the fire alarm system shall be modeled including all panels and devices with access zones (see 'm.' below) and conduit ¾" and larger. Large groups of conduit less than ¾" will be modeled to reflect the overall space requirements.

vi. Telecommunications

1. At a minimum, all cable tray, wire managements hooks, conduit ¾" and larger, communication racks and cabinets will be modeled. Large groups of conduit smaller than ¾" will be modeled to reflect the overall space requirements.

vii. Structural Fabrication

1. At a minimum, all columns, beams, girts, purlins, bracing, girders, trusses, joists, kickers, steel shapes, slabs, pre-cast concrete elements, laminated wood framing, metal floors and roof decks, pre-engineered building components, miscellaneous framing, trestles, and catwalks shall be modeled.

viii. Conveyance (elevators, escalators, etc)

1. At a minimum all equipment including service access, support connections, and mechanical spaces shall be modeled.

ix. Framing

1. Although standard wall and ceiling framing is not modeled; any atypical framing features required for tiered ceilings, soffits, curved walls, arched ceilings, etc. should be modeled to ensure there is enough available space for the additional framing/bracing for these components.

x. All Trades

1. Seismic bracing shall be shown where required.
2. When modeling Access and/or Clearance Zones:
    1. Above ceiling equipment zones must be modeled per equipment spec, building code, or Owner standard – whichever is greater; and must extend down to the level below to insure there is adequate space to land a ladder for access.
    2. Zones for equipment installed below ceiling must be modeled per equipment spec, building code, or Owner standard – whichever is greater; and must extend down to the level below.
    3. Unresolvable clashes with Zones must be approved by CM/GC.

xi. Specialty Systems shall be modeled by the contractor responsible for all systems specified in their work category. These can include, but are not limited to:

1. Overhead Projector Support Framing
2. Recessed Projection Screens
3. Medical Gas
4. Pneumatic Tube
5. Existing Structures or Systems located in areas requiring new work to be installed
6. Kitchen Equipment
7. Laboratory Equipment
8. Accessible Flooring Systems
9. Medical/Healthcare Equipment/Systems

q. Each trade shall be responsible for coordinating their systems with new or existing fixed

items, such as structural steel, concrete, MEP tie-in points, equipment, etc. which may require drafting by the respective trade contractor of individual components not modeled by others to the highest level of detail required to coordinate their work.

r. If the building structure is steel the initial coordination model containing the structural engineer's model will be updated with a steel fabrication model (when available). This will require all trades to review the model and may require some re-coordination.

s. Trade contractors are required to field verify existing conditions and connections as required for accurate modeling of their scope. Utilize existing sleeves, hangers and other critical elements as applicable for the renovation areas.

t. The design team is not necessarily contractually required to update their model to reflect existing conditions or provide detail beyond what is required in their contract with the Owner. Trade contractors are responsible for elevating the detail of the design model to the highest level of detail required to complete their modeling and coordination scope.

u. The weekly coordination meetings will not serve as a time to check systems against fixed building components, as this needs to be addressed ahead of file submission.

v. Each contractor is responsible for completing their design in accordance with local code compliance prior to submitting fully-coordinated designs for review by the architect or engineer of record.

w. After all coordinated components are in place, installation of items not included in the coordinated installation drawing may begin. Any items not in the coordinated model will be installed after coordinated items are in place or installed in a manner that allows coordinated scope to be installed as planned. Accessibility to install non-coordinated work is not an exclusion or exception to this requirement. Each participant is required to consider sequence of work when determining the degree of detail required.

1.7 MEP Spatial Coordination

a. Before starting the Coordination Process, CM/GC and subcontractors will review the pre-coordination model, 2D files, and drawings at a scheduled pre-coordination / coordination kickoff meeting. Information gathered at this meeting will be used to determine priority areas, identify potential problem areas, and note any details on the drawings that are not currently modeled that may need to be added to the model. CM/GC along with subcontractor coordination team will determine the number and size of coordination areas. The HVAC subcontractor will develop the document numbering sequence and deliver a Coordination Area Key Plan to all parties involved.

b. The CM/GC will develop a BIM Execution Plan or Coordination guidelines that establishes much of the agreements set forth in the BIM Kickoff Meeting. This document will include at a minimum the File Naming conventions, team member roles and responsibilities, coordination schedule milestones and meeting frequency, as-built and COBie deliverable requirements, and order of precedence for clash resolution.

c. Electronic MEP spatial interference reconciliation by the CM occurs during mandatory coordination meetings. Using collaboration software, the CM provides "real time" rendered views of the structure and MEP components, documentation of spatial interferences, and identification of the party responsible for making changes. During every

spatial coordination meeting, required changes are verbally communicated to the MEP Spatial Coordination Team members by the CM. A written log of challenging design requirements may be kept by the CM or CM as applicable.

d. The Design Team shall participate in the coordination meetings as needed to resolve spatial issues that may require design consideration. The Design Team must document and transfer to the CM for distribution to the MEP Spatial Coordination team any design changes that occur during the MEP spatial coordination process.

e. Each subcontractor will have a competent person, with a laptop, who is capable of running their design software and making competent decisions that do not negatively affect their system at all coordination meetings so changes can be worked out and verified during the meeting.

f. Subcontractors not internally modeling their own work must still have a representative at each meeting to make system decisions along with the external modeler also available either on site or via webex. Any cost associated with a web meeting that would not otherwise be required due to external modeling will be the responsibility of that subcontractor.

g. Any subcontractor responsible for more than 1 trade must have clashes between those trades worked out prior to coordination meetings. If clashes cannot be corrected before a meeting the issue(s) must be communicated to the coordination team for their input in potential resolutions.

h. The CM will host the meetings as a webinar with the intent that often the detailers are more efficient working in their regular workspace and can provide the best input, model updates, etc. while using their standard hardware connected to their network. However, if progress is not achieved in a timely manner to support the coordination or construction schedule, additional meetings may be necessary or in-person meetings may be made mandatory. To avoid this, it is in each trade contractors' best interest to resolve clashes and issues outside of the recurring meetings.

i. The meeting location will be determined by the team during the MEP Coordination Kick-Off Meeting. Variations to the regular meeting location may be necessary to improve progress, resolve issues, or accommodate technology limitations.

j. The CM may approve clashes based on discussions during meetings for minor rubbing, penetrations, accounting for field tolerances, etc. It is each trade's responsibility to install these components in the field per industry standards free of clashes.

k. Major changes made during the coordination process shall be clearly documented and submitted through the proper approval process to the Architect/Engineer. Minor changes during this process shall be noted in the "record drawing" documentation.

l. Conflicts that result in re-work due to an item not being included in the modeling process or a lack of modeling detail will be subject to re-work at no additional cost to other subcontractors, CM/GC, or the Owner. The subcontractor in error will be responsible for all costs associated with reworking their system, and/or the cost of having another system(s) move.

m. CM/GC will post the results of each coordination meeting that will include, at a minimum,

the following items:

I. NWD files of the model used at that meeting for coordination

II. Clash Report

III. Updated Coordination Schedule (PDF) - if applicable

IV. Signoff Sheet (PDF) - if applicable

1.8 Coordination Documents

a. When all spatial interferences and coordination issues have been resolved, each MEP coordination team member will produce complete and fully annotated installation drawings of their respective systems, including title blocks appropriate for installation by their field team.

b. Each subcontractor shall be responsible for updating the 3D model and "field installation" drawings as required in order to maintain coordination and construction.

c. Each trade shall prepare, in quantities established by the CM, color coded, with index, coordination drawings showing each of their respective coordinated systems, dimensioned off column lines or walls with elevation tags showing the distance above finish floor at milestones throughout the coordination process. If detailed, annotated drawings are not required for installation of the systems by the field crew due to use of technology, such as automated layout equipment or prefabrication, sufficient detail must be readily available in the model for other users to accurately determine if the work is installed as modeled.

d. "Sign-Off" of the coordinated plan is achieved when 2D plans are posted to the Installation Library on the project website. By posting these files, the trade contractor is communicating to the team that they are committing to installation of their systems per the coordinated model. It is each trade's responsibility to review the other trades' drawings and the model to ensure that constructability issues are resolved. Any issues identified by other trades must be communicated to the CM within 3 days of posting the drawings so they can be resolved prior to installation.

e. The CM will bundle all "Sign Off" drawings and submit them to the Design Team for review/approval/record of compliance with design intent. Any feedback must be addressed in both the model and the plans posted to the Installation Library.

f. The plans posted to the Installation Library and the current model in the BIM Library form the basis for resolution of any field installation conflicts or disagreements.

g. Prepare coordination drawings to organize installation of products for efficient use of available space, for proper sequence of installation, and to identify potential conflicts.

h. Prepare a master schedule to identify responsibilities under each section of Divisions 1 through 16 of the Specifications for activities which directly relate to this work, including submittals and temporary utilities. Identify electrical power characteristics and control wiring required for each item of equipment.

i. Maintain documents and your scope of the model for the duration of the Work, recording and modeling changes due to site instructions, modifications, adjustments or design changes (i.e. RFI's and Bulletins).

j. Provide copies of your coordination drawings or other contractors' drawings as necessary to supply your subcontractor(s) with the most accurate design. System component sizes, locations, and layouts may change from the base bid documents which are not typically updated in the contract documents until project completion by the AE unless specifically addressed by an RFI or bulletin.

k. Persons installing components not shown on, or not installed in accordance with, the "Coordination Sign-off Drawings" will relocate those components at their expenses and may be charged for any costs incurred to other trades or entities to accommodate the error.

l. Non-compliant parties bear all cost for rework, re-coordination, or schedule impact required to accommodate components not shown on, or not installed in accordance with, the "Coordination Sign-off Drawings," including impacts to other parties affected by their lack of compliance.

1.9 Record and As-Built Drawings

a. At project completion, each MEP participant shall:

i. Incorporate "As-Built" conditions affecting their work into the electronic files and provide a record set of drawings in PDF format. This includes all design changes issued via RFI response, bulletin, addenda, field conditions, etc.

ii. Provide printed copies of the PDF files in quantities required by project specification.

iii. Provide a final 3D model file in its native format.

iv. As-Built documents must include all pertinent information such as system ID (i.e. High Pressure Supply Air, Domestic Hot Water, Sanitary Vent, Fire Alarm Conduit, etc.), location of column lines or similar reference point, elevation, and size.

v. Provide rendered models for inclusion in a comprehensive "Project Master Model" assembled by the CM or other designated party.

1.10 As-Built BIMs and COBie Data:

a. Update all coordinated Construction BIMs (building, structure and building systems) to represent as-built conditions, including Architectural Supplemental Instructions, Change Notices, and field changes.

b. Create, for each discipline or system, an As-Built BIM for each floor of the building. Export to IFC format. If, for site and/or landscape model, IFC export is not available, provide site/landscape model in 3D DWG format, with all custom objects converted to native 3D AutoCAD objects.

c. Extract all As-Built Drawings at ¼" = 1'0" or smaller scale, and space and equipment inventories in COBie format, from the As-Built BIMs.

d. Deliver to the Owner the following:

i. As-Built BIMs in IFC format. If, for site and/or landscape model, IFC export is not available, provide site/landscape model in 3D DWG format, with all custom objects converted to native 3D AutoCAD objects.

ii. Full-floor, full-building and building and site composites in TBP format.
iii. Space and equipment inventories in COBie format, in conformance with the current version of the State of Tennessee Office of the State Architect (OSA) Building Information Modeling (BIM) Requirements
iv. Deliver three (3) electronic copies on CD or DVD.

e. Collect and embed data in the model as information becomes available throughout construction. For example, the following representative sample of information would be expected to be included in the model at key points for any given typical piece of equipment (actual information varies per equipment type:

i. Preliminary Model: Information provided in the bid docs (Type, ID Tag, TMA ID)

ii. Approved Submittals: Make, Model, Product Data Link

iii. Installation: Serial Number, O & M Link, Installation Date, Warranty Duration

f. Provide recurring model updates to the CM after coordination is complete, during construction, to allow the CM to verify the information is properly input and is up to date.

g. Specific data and links include:

i. For all equipment listed on the mechanical, electrical, lighting, and plumbing schedules in the contract documents, provide the following embedded data as applicable:

1. Manufacturer, model and serial number
2. Bulb type and quantity
3. Belt size/type and quantity
4. Filter size/type and quantity

ii. For all equipment listed on the mechanical, electrical, lighting, and plumbing schedules in the contract documents, provide the following document links:

1. O & M Manual
2. Each Individual Item's Approved Submittal

1.11 Hardware and Software Requirements

a. All MEP Spatial Coordination Team members are responsible to have, or obtain at their cost, the hardware and software required to participate efficiently in this critical phase of the project. Personnel participating in the coordination efforts of this project must be proficient in the use of this technology.

b. Computer Requirements

i. Minimum Hardware Requirements

1. Each member of the MEP Spatial Coordination Team will be required to have a laptop at each coordination meeting. This will help facilitate potential solution in real time during coordination meetings.

ii. Minimum Software Requirements

1. Each trade contractor must use an industry-accepted software platform for modeling their work in a manner that supports their workflow as well as incorporation into Navisworks Mange.
2. Free Viewers
    1. Each MEP Spatial Coordination Team member is required to have the Navisworks Freedom Viewer (unless they have Navisworks Manage) to review the models during 3D Coordination.
    2. At least one field staff member for each trade contractor must have an iPad to access the model on-site. This individual is responsible for having the latest coordination model cached on their iPad at all times.
3. Internet accessibility for accessing the project website and attending webinar meetings.

1.12 Logs (Maintained By CM or CM)

a. RFI / BIM Issue Log
b. Submittal
c. Contract Drawings
d. ASI
e. Change Proposal
f. Specifications

1.13 Structural/Architectural Features Required for MEP Spatial Coordination

a. Spatially accurate and dimensionally scalable building elements including but not limited to soffits, fixture locations, ceiling/floor tile locations, ADA clearances, interior wall framing, moment frame side plates, cross bracing, gusset plates, beam stiffeners, miscellaneous steel framing, and other similar entities within the modeling space requiring coordination with the MEP trades.

1.14 Fully Annotated Installation Drawings

a. Fully annotated installation drawings shall include all text, dimensions, and annotations required for physical location of all elements shown on the drawings in the physical space at the time of their installation.

1.15 Submittals

a. Submit name, address and telephone number of coordinator and name of principle officer to Construction Manager for review of his/her qualifications.
b. Submit Shop Drawings, Product Data and Samples as required by the specifications and as required to allow the spatial coordination process to be completed as scheduled.
c. All material and equipment submittals that may prohibit the coordinators ability to accurately, efficiently and responsibly design the respective scope 3-dimensionally must be submitted prior to the initial Building Information Modeling Kick-Off Meeting with

enough time to provide the AE with 2-weeks to review the submittal package in addition to normal processing times by the CM. If this is not feasible, placeholders must be drawn until an approved product is determined at which time an accurate representation of the approved product must be incorporated into the model.

d. All major equipment and materials must be approved as early as possible or in a coordinated manner with the coordination schedule to allow the spatial coordination team to accurately model the size, shape and component-specific parameters (e.g. pump inlet & outlet sizes and locations, overall equipment dimensions, housekeeping pad sizes, etc.).

1.16 Coordinate progress schedules and submittals and for delivery of products.

a. Conduct conferences among subcontractors and others concerned with the Work to establish and maintain coordination and schedules, and to resolve coordination clashes and materials in dispute.

b. Participate in progress meetings. Report on progress of Work to be adjusted under coordination requirements, and any required changes in schedules. Transmit minutes of meetings and reports to concerned parties.

c. Review Shop Drawings, Product Data and Samples for compliance with Contract Documents and for coordination among work of all sections of the Project Manual. Transmit to Contractor for review, and then transmit to Architect-Engineer.

d. Check field dimensions and clearances and relationship to available space and anchors.

e. Check compatibility with equipment and Work of other sections, electrical characteristics, and operational control requirements.

f. Check motor voltages and control characteristics.

g. Coordinate controls, interlocks, wiring of pneumatic switches and relays.

h. Coordinate wiring and control diagrams.

i. Review the effect of any changes on work of other sections.

j. Verify and coordinate maintenance of record documents.

END OF SECTION

SECTION 01 31 13.91
COMMISSIONING COORDINATION

PART 1 - GENERAL

1.01 COMMISSIONING

This project will have selected building systems commissioned by an independent third party Commissioning Agent ("CxA"), contracted by the Owner. The CxA will document installation and performance of the selected systems for the project. The Contractor and applicable subcontractors are members of the commissioning team and will facilitate the completion of the commissioning process. The equipment and systems to be commissioned and the commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 13, General Commissioning Requirements. Roles and responsibilities of each Commissioning Team member are also defined in Section 01 91 13. If applicable, specific division responsibilities may be found in Section 22 08 00 – Commissioning of Plumbing, Section 23 08 00 – Commissioning of HVAC or Section 26 08 00 – Commissioning of Electrical.

1.02 MEMBERS OF THE COMMISSIONING TEAM:

A. Commissioning Agent: The Owner will provide the services of a qualified CxA. The responsibilities of the CxA are defined in Section 01 91 00 13.. The CxA coordinates the commissioning process, develops a functional testing plan and documents the performance of each system.

B. Owner or Owner's Representative: Designated representative for the Owner with authority to approve the commissioning plan and implementation and accept field conditions if required.

C. Contractor: Facilitates the completion of the commissioning plan and its integration into the construction process, including coordination of the subcontractor responsibilities. Coordinates training and system startup with the Owner.

D. Designer: Provides all documents to the CxA, performs construction observations, sharing the results, and coordinates resolution of system deficiencies identified during construction.

E. Facility manager or plant operator: Participates in the commissioning tasks and performance testing, reviews the operating and maintenance documentation and attends applicable training.

F. Test and Balance Contractor: The Contractor shall provide the services of a qualified Test and Balance Contractor, as specified in Section 23 08 00, who will be subject to approval or rejection by Owner.

G. Controls Contractor: The Controls Contractor as specified in Section 23 08 00, will be subject to approval or rejection by Owner.

H. Other installing contractors or equipment suppliers that may be involved in the commissioning process.

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.01 SCHEDULING AND ATTENDANCE

A. The Designer, in cooperation with the Owner and the Contractor, will schedule and administer a Pre-Construction Conference, periodic Progress Meetings, and other specially called or required meetings.

B. Representatives of the Owner and the Designer will attend.

C. Representatives of the Contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.02 PRE-CONSTRUCTION CONFERENCE

A. A Pre-Construction Conference will be scheduled and conducted at the project site prior to the issuance of the Notice to Proceed.

B. The Pre-Construction Conference shall be attended by the Contractor's:

1. (Office) Job Manager,

2. (Field) Job Superintendent,

3. Major subcontractors' representatives,

4. Major suppliers' representatives, and

5. Others, as desired.

C. The Pre-Construction Conference is intended to be an opportunity for the Contractor to review administrative, procedural, and temporary facilities requirements of the Contract Documents, and to ask questions concerning the Work.

1.03 PROGRESS MEETINGS

A. Progress Meetings will be scheduled and conducted at the project site prior to the Contractor's submittal of an application for payment, or when deemed advisable by the Designer.

B. Progress Meetings shall be attended by the Contractor's:

1. (Office) Job Manager,

2. (Field) Job Superintendent,

3. Subcontractors' representatives, as befits the agenda,

4. Suppliers' representatives, as befits the agenda, and

5. Others, as appropriate.

C. Progress Meetings are intended to be a monthly opportunity for the Contractor to review and submit applications for payment, and attachments, and for a general review of the progress of the Work, aimed at identifying and mitigating impediments to timely completion.

END OF SECTION

SECTION 01 31 90
ADMINISTRATIVE LOGS

PART 1 - GENERAL

1.01 SUBMITTALS LOG

If any shop drawings, product data, or sample submittals are required by the Contract Documents, maintain a submittals log to record the status of submittals made to the Designer.

A. Submit three (3) copies with each application for payment.

B. Clearly identify the Project by Name and SBC Project Number.

C. Record activities with respect to shop drawings, product data, samples, and such other submittals which are required by the Contract Documents.

D. Indicate for each submittal made to date:

1. Title or name, and type of submittal;

2. Date submitted to the Designer;

3. Date returned by the Designer; and,

4. General nature of the Designer's response.

1.02 VISITOR LOG

Maintain visitor log in the field office (or with the Project Superintendent when no field office is required) to record visits by all persons not a part of the Contractor's forces, materials suppliers, or subcontractors' forces.

A. Submit three (3) copies with each application for payment.

B. Clearly identify the Project by Name and SBC Project Number.

C. Indicate:

1. Visitor name and affiliation,

2. Date of visit,

3. Time of arrival and departure, and

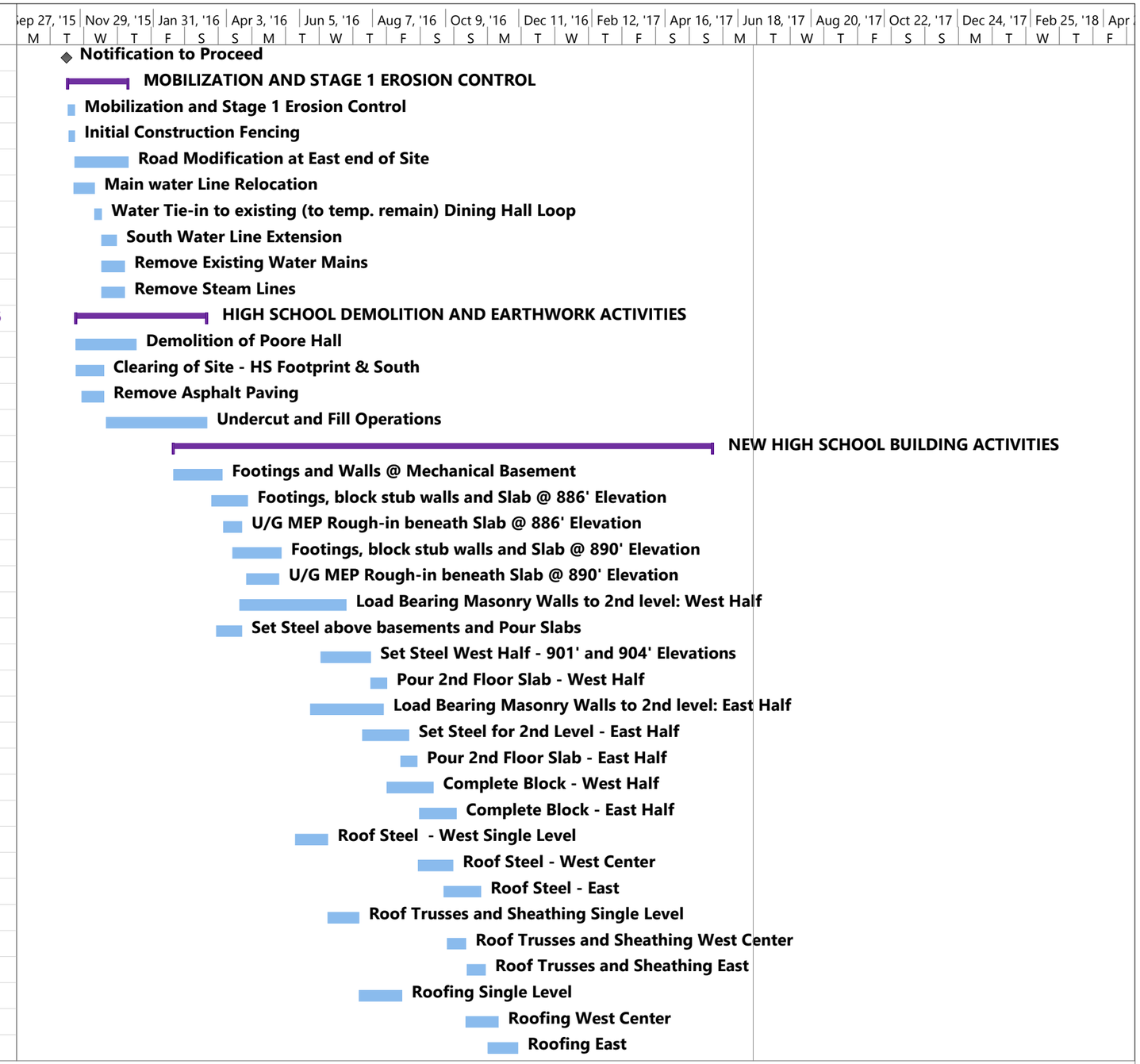
4. Company or agency represented and reason for presence.

END OF SECTION

01 32 00 CONSTRUCTION SCHEDULE

See Attached Construction Schedule.

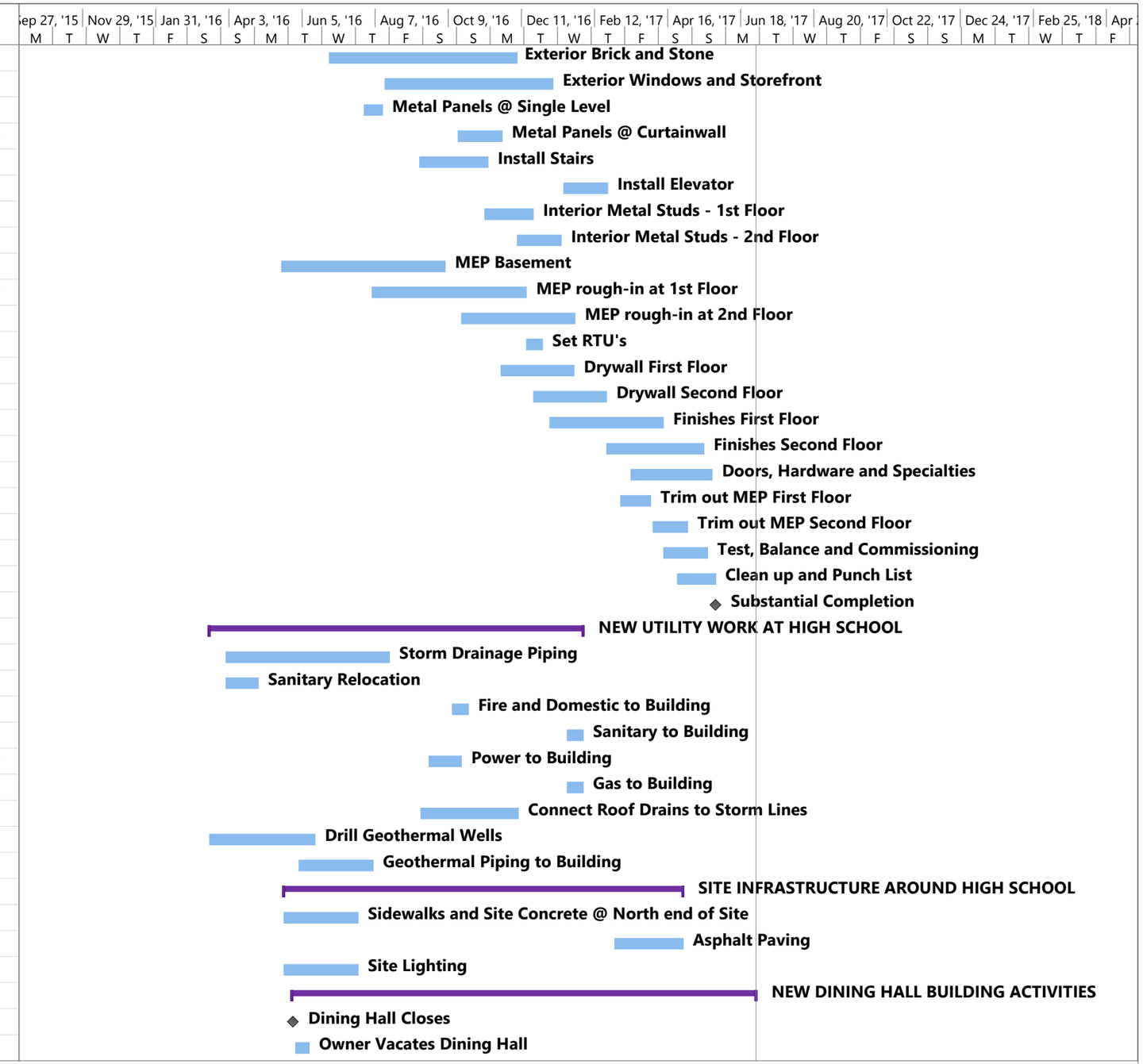
ID	Task Name	Duration	Start	Finish
1	Notification to Proceed	1 day	Mon 11/16/15	Mon 11/16/15
2	**MOBILIZATION AND STAGE 1 EROSION CONTROL**	**36 days**	**Wed 11/18/15**	**Fri 1/8/16**
3	Mobilization and Stage 1 Erosion Control	4 days	Wed 11/18/15	Mon 11/23/15
4	Initial Construction Fencing	3 days	Thu 11/19/15	Mon 11/23/15
5	Road Modification at East end of Site	32 days	Tue 11/24/15	Fri 1/8/16
6	Main water Line Relocation	14 days	Mon 11/23/15	Thu 12/10/15
7	Water Tie-in to existing (to temp. remain) Dining Hall Loop	4 days	Fri 12/11/15	Wed 12/16/15
8	South Water Line Extension	8 days	Thu 12/17/15	Tue 12/29/15
9	Remove Existing Water Mains	12 days	Thu 12/17/15	Tue 1/5/16
10	Remove Steam Lines	12 days	Thu 12/17/15	Tue 1/5/16
11	**HIGH SCHOOL DEMOLITION AND EARTHWORK ACTIVITIES**	**79 days**	**Wed 11/25/15**	**Wed 3/16/16**
12	Demolition of Poore Hall	36 days	Wed 11/25/15	Fri 1/15/16
13	Clearing of Site - HS Footprint & South	18 days	Wed 11/25/15	Fri 12/18/15
14	Remove Asphalt Paving	15 days	Mon 11/30/15	Fri 12/18/15
15	Undercut and Fill Operations	61 days	Mon 12/21/15	Wed 3/16/16
16	**NEW HIGH SCHOOL BUILDING ACTIVITIES**	**332 days**	**Wed 2/17/16**	**Fri 5/26/17**
17	Footings and Walls @ Mechanical Basement	30 days	Wed 2/17/16	Tue 3/29/16
18	Footings, block stub walls and Slab @ 886' Elevation	23 days	Mon 3/21/16	Wed 4/20/16
19	U/G MEP Rough-in beneath Slab @ 886' Elevation	12 days	Thu 3/31/16	Fri 4/15/16
20	Footings, block stub walls and Slab @ 890' Elevation	30 days	Fri 4/8/16	Thu 5/19/16
21	U/G MEP Rough-in beneath Slab @ 890' Elevation	20 days	Wed 4/20/16	Tue 5/17/16
22	Load Bearing Masonry Walls to 2nd level: West Half	65 days	Thu 4/14/16	Thu 7/14/16
23	Set Steel above basements and Pour Slabs	16 days	Fri 3/25/16	Fri 4/15/16
24	Set Steel West Half - 901' and 904' Elevations	30 days	Thu 6/23/16	Thu 8/4/16
25	Pour 2nd Floor Slab - West Half	10 days	Fri 8/5/16	Thu 8/18/16
26	Load Bearing Masonry Walls to 2nd level: East Half	44 days	Tue 6/14/16	Mon 8/15/16
27	Set Steel for 2nd Level - East Half	28 days	Fri 7/29/16	Tue 9/6/16
28	Pour 2nd Floor Slab - East Half	10 days	Wed 8/31/16	Tue 9/13/16
29	Complete Block - West Half	28 days	Fri 8/19/16	Tue 9/27/16
30	Complete Block - East Half	22 days	Fri 9/16/16	Mon 10/17/16
31	Roof Steel - West Single Level	20 days	Wed 6/1/16	Tue 6/28/16
32	Roof Steel - West Center	22 days	Thu 9/15/16	Fri 10/14/16
33	Roof Steel - East	22 days	Fri 10/7/16	Mon 11/7/16
34	Roof Trusses and Sheathing Single Level	18 days	Wed 6/29/16	Mon 7/25/16
35	Roof Trusses and Sheathing West Center	12 days	Mon 10/10/16	Tue 10/25/16
36	Roof Trusses and Sheathing East	12 days	Thu 10/27/16	Fri 11/11/16
37	Roofing Single Level	27 days	Tue 7/26/16	Wed 8/31/16
38	Roofing West Center	20 days	Wed 10/26/16	Tue 11/22/16
39	Roofing East	20 days	Mon 11/14/16	Fri 12/9/16



Preliminary Construction Schedule
A New High School and Dining Hall for the:
Tennessee School for the Deaf - Knoxville, Tennessee

RENTENBACH
A CHRISTMAN COMPANY

ID	Task Name	Duration	Start	Finish
40	Exterior Brick and Stone	115 days	Tue 6/28/16	Tue 12/6/16
41	Exterior Windows and Storefront	105 days	Mon 8/15/16	Fri 1/6/17
42	Metal Panels @ Single Level	12 days	Thu 7/28/16	Fri 8/12/16
43	Metal Panels @ Curtainwall	28 days	Mon 10/17/16	Wed 11/23/16
44	Install Stairs	43 days	Wed 9/14/16	Fri 11/11/16
45	Install Elevator	28 days	Mon 1/16/17	Wed 2/22/17
46	Interior Metal Studs - 1st Floor	30 days	Wed 11/9/16	Tue 12/20/16
47	Interior Metal Studs - 2nd Floor	28 days	Wed 12/7/16	Fri 1/13/17
48	MEP Basement	100 days	Wed 5/18/16	Wed 10/5/16
49	MEP rough-in at 1st Floor	95 days	Thu 8/4/16	Wed 12/14/16
50	MEP rough-in at 2nd Floor	70 days	Thu 10/20/16	Wed 1/25/17
51	Set RTU's	10 days	Thu 12/15/16	Wed 12/28/16
52	Drywall First Floor	45 days	Wed 11/23/16	Tue 1/24/17
53	Drywall Second Floor	45 days	Wed 12/21/16	Tue 2/21/17
54	Finishes First Floor	70 days	Wed 1/4/17	Tue 4/11/17
55	Finishes Second Floor	60 days	Wed 2/22/17	Tue 5/16/17
56	Doors, Hardware and Specialties	50 days	Wed 3/15/17	Tue 5/23/17
57	Trim out MEP First Floor	20 days	Mon 3/6/17	Fri 3/31/17
58	Trim out MEP Second Floor	22 days	Mon 4/3/17	Tue 5/2/17
59	Test, Balance and Commissioning	28 days	Wed 4/12/17	Fri 5/19/17
60	Clean up and Punch List	25 days	Mon 4/24/17	Fri 5/26/17
61	Substantial Completion	1 day	Fri 5/26/17	Fri 5/26/17
62	**NEW UTILITY WORK AT HIGH SCHOOL**	**229 days**	**Thu 3/17/16**	**Wed 2/1/17**
63	Storm Drainage Piping	100 days	Thu 3/31/16	Thu 8/18/16
64	Sanitary Relocation	20 days	Thu 3/31/16	Wed 4/27/16
65	Fire and Domestic to Building	10 days	Wed 10/12/16	Tue 10/25/16
66	Sanitary to Building	10 days	Thu 1/19/17	Wed 2/1/17
67	Power to Building	20 days	Thu 9/22/16	Wed 10/19/16
68	Gas to Building	10 days	Thu 1/19/17	Wed 2/1/17
69	Connect Roof Drains to Storm Lines	60 days	Thu 9/15/16	Wed 12/7/16
70	Drill Geothermal Wells	65 days	Thu 3/17/16	Wed 6/15/16
71	Geothermal Piping to Building	45 days	Thu 6/2/16	Thu 8/4/16
72	**SITE INFRASTRUCTURE AROUND HIGH SCHOOL**	**245 days**	**Fri 5/20/16**	**Fri 4/28/17**
73	Sidewalks and Site Concrete @ North end of Site	45 days	Fri 5/20/16	Fri 7/22/16
74	Asphalt Paving	43 days	Wed 3/1/17	Fri 4/28/17
75	Site Lighting	45 days	Fri 5/20/16	Fri 7/22/16
76	**NEW DINING HALL BUILDING ACTIVITIES**	**285 days**	**Fri 5/27/16**	**Fri 6/30/17**
77	Dining Hall Closes	1 day	Fri 5/27/16	Fri 5/27/16
78	Owner Vacates Dining Hall	10 days	Mon 5/30/16	Fri 6/10/16



Preliminary Construction Schedule
A New High School and Dining Hall for the:
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RENTENBACH
A CHRISTMAN COMPANY

ID	Task Name	Duration	Start	Finish
79	Dining Hall Abatement	10 days	Mon 6/13/16	Fri 6/24/16
80	Dining Hall Demolition	19 days	Mon 6/27/16	Fri 7/22/16
81	Retaining Wall at East Side	25 days	Mon 6/13/16	Mon 7/18/16
82	Utility Modifications at East side	24 days	Mon 5/30/16	Thu 6/30/16
83	Utility Relocations at South, North and West sides	19 days	Fri 7/1/16	Thu 7/28/16
84	Construct Building Pad	10 days	Mon 7/25/16	Fri 8/5/16
85	Foundations	15 days	Mon 8/8/16	Fri 8/26/16
86	U/G MEP Rough-in	20 days	Mon 8/22/16	Fri 9/16/16
87	Masonry Stub Walls	20 days	Thu 9/1/16	Wed 9/28/16
88	Pour Slab on grade	13 days	Mon 9/19/16	Wed 10/5/16
89	Masonry Walls	25 days	Mon 10/3/16	Fri 11/4/16
90	Erect Structural Steel	20 days	Mon 10/31/16	Fri 11/25/16
91	Erect Roof Deck	10 days	Mon 11/21/16	Fri 12/2/16
92	Light gauge Trusses	15 days	Mon 12/5/16	Fri 12/23/16
93	Plywood, Underlayment and Metal Roof	19 days	Tue 12/27/16	Fri 1/20/17
94	Single Ply Roofing	19 days	Tue 1/10/17	Fri 2/3/17
95	Brick and Stone Veneer	65 days	Mon 12/5/16	Fri 3/3/17
96	Aluminum Storefront and Windows	35 days	Mon 1/30/17	Fri 3/17/17
97	MEP Rooftop Equipment and Piping	30 days	Mon 2/6/17	Fri 3/17/17
98	MEP Rough-in	65 days	Mon 1/2/17	Fri 3/31/17
99	Drywall Walls and Ceilings	25 days	Thu 3/16/17	Wed 4/19/17
100	Ceiling Grid	15 days	Mon 4/3/17	Fri 4/21/17
101	Prime Painting	20 days	Mon 4/3/17	Fri 4/28/17
102	Install Freezers and Coolers	10 days	Tue 2/28/17	Mon 3/13/17
103	Epoxy Flooring	25 days	Tue 3/14/17	Mon 4/17/17
104	Terrazzo Flooring	20 days	Mon 4/3/17	Fri 4/28/17
105	VCT Flooring	10 days	Mon 5/1/17	Fri 5/12/17
106	Doors, Hardware and Specialties	35 days	Thu 4/13/17	Wed 5/31/17
107	Final Paint	22 days	Thu 5/11/17	Fri 6/9/17
108	MEP Trim	25 days	Mon 4/24/17	Fri 5/26/17
109	Food Service Equipment	22 days	Mon 4/17/17	Tue 5/16/17
110	Test, Balance and Commissioning	20 days	Mon 5/29/17	Fri 6/23/17
111	Clean up and Punch List	24 days	Mon 5/29/17	Thu 6/29/17
112	Substantial Completion	1 day	Fri 6/30/17	Fri 6/30/17
113	**DINING HALL UTILITIES AND SITE INFRASTRUCTURE**	**80 days**	**Thu 2/2/17**	**Wed 5/24/17**
114	Utilities Tie-ins to Building	25 days	Thu 2/2/17	Wed 3/8/17
115	Site Concrete at Dining Hall and rest of site	50 days	Thu 3/16/17	Wed 5/24/17
116	Asphalt Paving	15 days	Mon 5/1/17	Fri 5/19/17

Preliminary Construction Schedule
A New High School and Dining Hall for the:
Tennessee School for the Deaf - Knoxville, Tennessee

RENTENBACH
A CHRISTMAN COMPANY

SECTION 01 32 15
PROGRESS SCHEDULES AND REPORTS

PART 1 - GENERAL

1.01 INITIAL PROGRESS SCHEDULE

A. Submit within twenty-one (21) days of award of the Contract, and not later than the date of submission of the first application for payment. Clearly identify the Project on the schedule.

B. Outline the orderly progress of the Work as planned from the Notice to Proceed through Substantial Completion on the contractually required date. Categorize the Work by Phase (if Phases are specified), major work area, and distinct trade or team, and divide into individual activities of one month or less duration each. Provide an identifiable relationship to the schedule of values. Identify projected monthly progress, points of fifty percent (50%) completion and Substantial Completion, and other major milestones.

C. A bar chart or critical path method is acceptable, or other method that is approved by the Designer.

1.02 SUBMITTALS SCHEDULE

A. Submit with the initial Progress Schedule. Clearly identify the Project by Name and SBC Project Number, and format in a manner similar to the initial progress schedule, utilizing the same method, or make a part of the initial Progress Schedule.

B. Identify submittals to be made. Show date for submission and date by which Designer should respond, allowing sufficient time for review.

C. Designer may require revision of schedule if times allotted for review are insufficient.

1.03 UPDATED PROGRESS SCHEDULE

A. Submit three (3) copies with each application for payment.

B. Clearly identify the Project by Name and SBC Project Number. Format in a manner similar to the initial progress schedule, utilizing the same method.

C. Indicate:

1. Work as initially scheduled,

2. Actual progress through the period covered by the current application for payment, and

3. Planned progress through Substantial Completion, including extensions of time made by change order or construction change directive.

D. If actual progress falls behind projections, show how the backlog is to be made up so that the Work will be completed on time.

END OF SECTION

SECTION 01 33 00 - SUBMITTALS PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;
   1. Contractor's construction schedule.
   2. Shop Drawings.
   3. Product Data.
   4. Samples.
   5. Sustainable Design Requirements.

B. Administrative Submittals: Refer to other Division 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals may include, but are not limited to:
   1. Permits.
   2. Application and Certification for Payment.
   3. Performance and Payment Bonds.
   4. Insurance certificates.
   5. List of Subcontractors.

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
      a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
   3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals.
      a. Allow two weeks (ten working days minimum) for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly

advise the Contractor when a submittal being processed must be delayed for coordination.

b. If an intermediate submittal is necessary, process the same as the initial submittal.

c. Allow two weeks (ten working days minimum) for reprocessing each submittal.

d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4 x 5 inches on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken. Provide a smaller clear area for Architect's review stamp.

2. Include the following information on the label for processing and recording action taken.

a. Project name.

b. Date.

c. Name and address of Architect.

d. Name and address of Contractor.

e. Name and address of subcontractor.

f. Name and address of supplier.

g. Name of manufacturer.

h. Number and title of appropriate Specification Section.

i. Drawing number and detail references, as appropriate.

j. Provide a unique sequential number for each submittal.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

1. On the transmittal, record relevant information and requests for data. On the form, or on a separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

2. The contractor shall include on the transmittal for each submittal, a unique sequential number for each submittal, starting with the number 1, as indicated above.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit within 30 days of the date established for "Commencement of the Work".

1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each

week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".

2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
5. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit Work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.

C. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.

D. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the Work. Indicate where each element in an area must be sequenced or integrated with other activities.

E. Cost Correlation: At the head of the schedule, provide a two item cost correlation line, indicating, "pre-calculated" and "actual" costs. On the line show dollar-volume of Work performed as of the dates used for preparation of payment requests.
   1. Refer to Section "Applications for Payment" for cost reporting and payment procedures.

F. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
   1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

G. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
1. Dimensions.
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full- size Drawings, submit Shop Drawings on sheets at least 8-1/2 x 11 inches, but no larger than 36 x 48 inches.
7. Final Submittal: Submit four (4) blue-line or black-line prints and 2 additional prints where required for maintenance manuals, plus the number of prints needed by the Contractor for distribution. Two (2) prints will be retained; the remainder returned.
8. Electronic submittals will be considered. Coordinate with Architect PRIOR to submitting for electronic submittal requirements.

C. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

D. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.

E. Preparation of coordination Drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

F. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

1.6 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in

diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."

1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
   a. Manufacturer's printed recommendations.
   b. Compliance with recognized trade association standards.
   c. Compliance with recognized testing agency standards.
   d. Application of testing agency labels and seals.
   e. Notation of dimensions verified by field measurement.
   f. Notation of coordination requirements.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
3. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.
4. Submittals: Submit two copies of each required submittal; submit four copies where required for maintenance manuals. The Architect will retain one, and will return the other marked with action taken and corrections or modifications required.
   a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
5. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
   a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
   b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.7 SAMPLES

A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
   1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's Sample. Include the following:
      a. Generic description of the Sample.
      b. Sample source.
      c. Product name or name of manufacturer.
      d. Compliance with recognized standards.
      e. Availability and delivery time.
   2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison

of these characteristics between the final submittal and the actual component as delivered and installed.

a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.

b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.

c. Refer to other Specification Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.

3. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

a. Preliminary submittals will be reviewed and returned with the Architect's mark indicating selection and other action.

4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit minimum three (3) sets; one will be returned marked with the action taken.

5. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

b. Sample sets may be used to obtain final acceptance of the construction associated with each set.

6. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

a. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.

1) Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.8 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to section 01 81 13 for Sustainable Design Requirements. All submittals, shop drawings, product data, and samples, shall include sustainable design information applicable to the product.

B. Reference: Tennessee High Performance Building Requirements (HPBr): Manual for required submittal information.

1.9 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.
   1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
   1. “Conforms with design concept”: Work may proceed providing it complies with Contract Documents.
   2. “Conforms with design concept as noted”: Work may proceed providing it complies with notations on submittal and with the Contract Documents.
   3. “Revise as noted and Resubmit”: Do not proceed with work. Revise submittal in accordance with notations thereon and resubmit to obtain a different action marking. Do not allow submittals with this action marking to be used in connection with performance of the work. In resubmitting, limit corrections to the items marked.
   4. “Rejected”: Do not proceed with the work. Submittal is rejected for non-compliance with the Contract Documents or other justified cause. Correct the submittal and resubmit to obtain a different action marking. Do not allow submittals with this action marking to be used in connection with the performance of the work.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01 33 00

SECTION 01 33 91
COMMISSIONING SUBMITTALS

PART 1 - GENERAL

1.01 SUBMITTAL REQUIREMENTS FOR COMMISSIONING

A. Contractor Submittals

1. The Commissioning Agent ("CxA") will receive a copy of all submittals for equipment to be commissioned from the Contractor.

2. The CxA will review and verify Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, adequacy for developing functional test procedures and for conformance with the Owner performance requirements and the Project basis of design. This shall occur concurrently with the Designer review.

B. Data for Commissioning

1. The Contractor will provide submittals for all equipment to be commissioned to the CxA at the same time submittals are sent to the Designer.

2. At a minimum, this will include the manufacturer and model number, detailed manufacturer installation and start-up information, full sequence of operation information, operating and maintenance data, performance data such as fan and pump curves, full factory testing reports and all control drawings. Submittals should also include troubleshooting and maintenance procedures, full details of any required. Owner-contracted testing or chemical treatment, and full warranty information, including clearly identifying all responsibilities of the Owner to keep the warranty in force. The installation and checkout materials that are shipped inside the equipment and the actual field checkout forms to be used by the factory or field technicians during installation and startup shall be submitted to the CxA.

3. The CxA may request further documentation necessary for the commissioning process.

4. The CxA will notify the Designer and Owner of missing items or areas that are not in conformance with the contract documents and may provide recommendations for optimization such as equipment set points and revised control sequence of operations for total cost of ownership energy savings.

C. Contractor's responsibility for deviations in submittals from requirements of the contract documents is not relieved by the CxA review.

END OF SECTION

SECTION 01 35 13.22
SPECIAL SCHOOLS' PROJECT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

General restrictions on access to and use of site and surroundings, and security procedures for tools, materials, and individuals within the work force.

1.02 SUPERVISION

A. Provide on-site supervision of construction personnel at all times.

B. A State Special School's Tennessee School for the Blind (TSB); Tennessee School for the Deaf (TSD); West Tennessee School for the Deaf (WTSD); and Alvin C. York Agricultural Institute (YAI) representative will be designated as the facility point of contact at the pre-construction meeting to assist the Contractor with any daily concerns while the work is in progress.

C. The Contractor shall be responsible for issuing any and all changes in the scope of the Work, and the State Special Schools' staff is not to direct the Contractor's Work in any way.

1.03 ACCESS TO SITE

A. Access is normally restricted to:

1. TSB - the period from 7:00am to 5:00pm, Monday through Friday;

2. TSD - the period from 8:00am to 4:30pm, Monday through Friday;

3. WTSD - the period from 7:30am to 4:30pm, Monday through Friday; and,

4. YAI - the period from 7:00am to 4:30pm, Monday through Friday.

The State Special Schools will allow additional hours at their discretion. Contractors shall provide the Designer and designated facility point of contact a schedule for the work, and upon approval of the schedule, shall provide forty-eight (48) hours notice with the exception of TSB which requires twenty-four (24) hours notice, before working evenings, week-ends, or holidays.

B. Contractor's access to site may be gained at:

1. TSB - through issuance of a visitor's pass from the procurement office located in Building 16;

2. TSD - the main security gate located at the east end of Island Home Boulevard;

3. WTSD - the Contractor shall inform the facility point of contact that the work crews are in the area, and in which building they are to be working; and,

4. YAI - will be either the high school office or maintenance building office. This will be determined by project.

C. Contractor shall be responsible to sign in on a daily basis. The State Special Schools may provide workmen with work badges while on site, however, Contractor's personnel will still be required to sign in at the security desk. The security desk will inform the facility point of contact that the work crews are in the area, and in which building they are to be working. Changes and additions to normal working schedules shall be communicated to the facility point of contact's office forty-eight (48) hours in advance of arrival of approved work, with the exception of TSB which requires twenty-four (24) hours notice.

D. The facility point of contact will endeavor to notify the Contractor as soon as possible if a situation exists which may preclude timely access to the buildings and/or site.

E. The Contractor and subcontractors are expected to enforce existing Tennessee Occupational Safety and Health Administration (TOSHA) standards for the protection of their workers and State Special School personnel and students. Hearing protection, hearing conservation and Material Safety Data Sheets (MSDS) shall be submitted to the facility point of contact prior to the introduction of any compounds being introduced to the campus. The above TOSHA standards are not to be considered as all inclusive, but are cited as examples.

1.04 USE OF SITE

A. Use of site shall be confined to the specific areas of Work. There shall be no access to other areas of the facility except as specifically approved by the respective State Special School's Superintendent.

B. The facility point of contact will identify an area for storage of materials to be utilized by the Contractor. This area shall be secured from the surrounding space using a minimum four foot (4'-0") orange nylon fence. The fence will remain tight with no sagging. All materials shall be contained within this space.

C. Vehicles: Work trucks are permitted on-site as needed. All vehicles must be locked; if they are capable of being fully locked, this includes tool compartments.

1.05 TOOLS AND MATERIALS

A. Contractor shall endeavor to introduce only necessary tools into the facility, and in the least possible number. At no time shall Contractor leave tools and/or materials unattended.

B. Hand tools shall be kept in Contractor's possession at all times when not properly stored. Tools shall be removed or placed in a locked toolbox, shed, trailer, or similar tool storage area.

C. Storage of hand tools at site will not be permitted unless such tools are securely stored in a manner acceptable to the facility point of contact. Contractor shall provide locks on all tool storage containers while on the premises and keep containers locked when not in use.

D. Do not give or loan tools or supplies to students or facility personnel. Do not accept anything from a student or facility personnel. Report thefts immediately to the security office. Do not offer advice; give money, candy, cigarettes, etc. to students or facility personnel.

E. Immediately report lost "Class A Tools" to the facility point of contact. The following partial list of general Class A Tools is considered to be hazardous and likely to be used in the abuse of self or others. "Class B Tools" are all other tools.

Blades of any kind	Ladder
Channel locks	Pliers
Chisels of any kind	Putty knife
Conduit bender	Rope
Crowbar	Sander or sandpaper
Cutters of any kind	Saw
Cutting tips	Shears
Drill	Snips
File	Soldering gun
Grinder	Stud gun
Hacksaw	Stud gun loads
Hammer	Vice grips
Impact gun	Wrecking bar
Knives of any kind	Wrench

F. The Contractor shall be responsible for the transportation, care, protection, and storage on site of his materials to the end that all materials shall be in perfect condition at the time of incorporation into the work. All storage and operations on the site shall be confined to areas that are coordinated with and authorized by the facility point of contact.

1.06 SEARCH AND SEIZURE

A. Facility point of contact may seize items that may pose a danger to the safety and security of the students or staff.

B. Vehicles parked on school property by students or visitors are subject to search for drugs, drug paraphernalia, or dangerous weapons (TCA 49-6-4204). The carrying of weapons, except by duly authorized law enforcement personnel, is strictly prohibited.

1.07 FACILITY PERSONNEL RULES

A. The Contractor or Contractor's employees shall immediately contact the facility point of contact or the security personnel concerning any problems with students or staff.

B. Identification of Personnel

An identification card will be provided to each construction employee who enters the facility. Workers will be required to show a valid driver's license, social security card, and verification of employment from the Contractor in order for card to be issued. Identification cards must be worn in plain sight at all times. If lost or stolen, employee must report to the security office for issuance of a new card. Identification cards (or pass) shall be returned to the security office upon completion of work or termination of employment.

C. Association with Students

1. Association with students is not permitted.

2. Trading in goods with students and staff is not permitted.

D. Do not bring items which are not required for performance of work, neither in personal vehicles nor on one's person. Remove unnecessary items from vehicles so that searches may proceed quickly.

E. Alcoholic Beverages, Weapons, Drugs, and Tobacco

1. Alcoholic beverages, weapons, and non-prescription drugs are not allowed on site. Persons caught introducing illegal or banned items onto the facility grounds will be turned over to the appropriate authorities having jurisdiction in the area.

2. Individuals using prescription medications are requested to bring only enough medication for one day at a time. Do not leave medications unsecured in vehicles.

3. No tobacco products usage, including eCigarettes, are allowed on campus.

F. Meals

1. Workers should bring their lunch or leave the facility to obtain meals. Food service to construction workers will not be provided.

2. If vending machines are available in the work area, they may be used while work is in progress as long as trash is removed from the work area and properly discarded.

G. Visitors - On site visitors of Contractor's employees are prohibited.

H. The Contractor, Contractor's employees, sub-contractors, and sub-contractor's employees upon directly or indirectly identifying a student shall keep such information confidential.

I. Background Checks

1. Contractors, at their own expense, must have completed Tennessee Bureau of Investigation (TBI) /Federal Bureau of Investigation (FBI) Tennessee Applicant Processing Services (TAPS) background checks on file for each employee performing services on the campus of any of the State Special Schools including: Tennessee School for the Deaf, West Tennessee School for the Deaf, Tennessee School for the Blind or York Agricultural Institute pursuant to TCA §49-5-413.

The following website may be used to check the Sex Offender Registry: www.ticic.state.tn.us/SEX_ofndr/search_short.asp.

Any/all background checks must be current, which include, but is not limited to, dated from bid opening date through the life of the Project.

2. The school superintendent or designee has the right to refuse admittance/campus access to any individual.

3. Copies of all background checks shall be kept on-site in the construction superintendent's or designee's office. A confirmation copy will be provided to the superintendent of the special school or designee.

1.08 EMERGENCIES

If the State Special School declares a state of emergency, the Contractor may be:

A. Required to leave the premises, or

B. Confined to specific area for duration of the emergency.

1.09 POLICY STATEMENT ON WORKPLACE HARASSMENT

The State of Tennessee is firmly committed to the principle of fair and equal employment opportunities for its citizens and strives to protect the rights and opportunities of all peoples to seek, obtain, and hold employment without being subject to illegal harassment in the workplace. It is the State's policy to provide an environment free of harassment of an individual because of that person's race, color, national origin, age (over 40), sex, pregnancy, religion, creed, disability, veteran's status or any other category protected by state and/or federal civil rights laws.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

The contractor shall be responsible for lawn, landscaping, and grounds maintenance inside the construction area enclosure fence during the execution of the work.

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Workmanship
2. Manufacturer's Instructions
3. Manufacturer's Certificates
4. Field Samples
5. Manufacturer's Field Services
6. Testing Laboratory Services

1.3 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.4 MANUFACTURER'S INSTRUCTIONS

A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

1.5 MANUFACTURER'S CERTIFICATES

A. When required by individual specification sections, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements.

1.6 FIELD SAMPLES

A. When required by individual specification sections, construct field samples at Project and at location acceptable to the Architect.

B. Construct field sample complete and finished incorporating products and procedures specified for the Work.

C. Upon acceptance by the Architect, use as a standard for the Work.

D. When directed by the Architect, remove field samples from the Project.

1.7 MANUFACTURER'S FIELD SERVICES

A. When specified in individual specification sections, require supplier or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, or test, adjust, and balance of equipment as applicable, and to make appropriate recommendations.

B. Representative shall submit written report to Architect listing observations and recommendations.

1.8 TESTING LABORATORY SERVICES

A. Geotechnical Testing Services are to be performed under separate contract.

B. Contractor shall obtain pricing for services of an Independent Testing Laboratory to perform inspections, tests, and other services required by other individual specification sections and payment will be made through Change order Request to the project.

C. Services will be performed in accordance with requirements of governing authorities and with specified standards.

D. Reports will be submitted to the Architect in duplicate giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.

E. Contractor shall cooperate with Testing Laboratory personnel; furnish tools, samples of materials, submittal data, equipment, storage and assistance as required.
   1. Notify Architect and Testing Laboratory 24 hours prior to expected time for operations requiring testing services.
   2. Make arrangements with Testing Laboratory and pay for additional samples and tests for Contractor's convenience.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 40 00

SECTION 01 41 15
REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 CODES AND REGULATIONS

The Regulatory Requirements used for State Building Commission projects are listed below as a convenience and may not be inclusive of all that apply. Others may also apply. Comply with all pertinent codes, standards, regulations, and laws.

	DOCUMENT	SOURCE	PHONE
1.	2006 ICC International Building Code (Except Chapter 11 – Accessibility; Chapter 27 – Electrical; and the International Electrical Code) 2006 ICC International Plumbing Code 2006 ICC International Fuel Gas Code 2006 ICC International Mechanical Code	International Code Council, Inc. Regional Office 900 Montclair Road Birmingham, Alabama 35213-1206	(888) 422-7233
2.	2006 International Fire Code -AND- NFPA *Life Safety Code* 2006 Edition	International Code Council, Inc. Regional Office 900 Montclair Road Birmingham, Alabama 35213-1206 National Fire Protection Association Batterymarch Park Quincy, Massachusetts 02269-9101	(888) 422-7233 (888) 422-7233
3.	2004 and 2005 S with 11/28/04 Supplements American National Safety Code (elevators, etc.) ANSI A17-1	American National Standards Institute 345 East 47th Street New York, NY 10017	(800) 843-2763
4. **5.**	2011 Tennessee Elevator Code And its Supplements 2007 Edition of Boiler and Unfired Pressure Vessel Inspection Law, Rules, and Regulations	TN Dept. of Labor and Workforce Development Div. of Boiler & Elevator Inspection 220 French Landing Drive Nashville, TN 37243-1006	(615) 741-2123
6. **7.**	ASHRAE Std 90.1-2007 Energy Standards for Buildings except Low-Rise Residential Buildings ASHRAE Std 90.2-2007 Energy-Efficient Design of New Low-Rise Residential Buildings ASHRAE Std 62-2007 Ventilation for Acceptable Indoor Air	American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) 1791 Tullie Circle NE Atlanta, Georgia 30329	(800) 527-4723
8.	Rules of TN Dept. of Commerce & Insurance Ch 0780-2-1, Electrical Installations Ch 0780-2-2, Codes and Standards Ch 0780-2-3, Plans and Specs Review Ch 0780-2-18, Equitable Restrooms	TN Dept. of Commerce and Insurance Div. of Fire Prevention & Plans Review 3rd Floor Davy Crockett Tower 500 James Robertson Parkway Nashville, TN 37243-1162	(615) 741-7190
9.	2010 ADA Standards for Accessible Design	U.S. Department of Justice Civil Rights Division http://www.ada.gov	(800) 514-0301
10.	Rules of TN Dept. of Environment & Conservation Ch 0400-40-02, Water Resources Regulations Ch 1200-01-18, Lead Based Paint Abatement Ch 1200-01-20, Asbestos Accreditation Requirements Ch 1200-03-09, General Requirements for Construction permits Ch 1200-03-11, Hazardous Air Contaminant Regulation	TN Dept. of Environment and Conservation 312 Rosa L. Parks Avenue William R. Snodgrass Tennessee Tower Nashville, Tennessee 37243 http://www.tn.gov/environment/permits/whoami.shtml	(888) 891-8332 (TDEC)

END OF SECTION

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. General: Where codes and standards are referenced in this and other sections of the specifications or on the drawings, whether or not a particular edition is referenced, it is the intention that these be the latest editions as adopted by the governing agency under whose jurisdiction the project is to be constructed, on the date approval is granted for construction to begin.

1.3 CODES

A. Work shall conform to the requirements of the currently adopted International Code Council series building codes, including any amendments or revisions, as adopted by the Authority Having Jurisdiction.

B. Work shall conform to the requirements of the currently adopted Life Safety Code, NFPA 101, including any amendments or revisions, as adopted by the Authority Having Jurisdiction.

C. Work shall conform to the requirements of the currently adopted National Electric Code, NFPA 70, including any amendments or revisions, as adopted by the Authority Having Jurisdiction.

D. Work shall conform to the requirements of the currently adopted accessibility code, including any amendments or revisions, as adopted by the Authority Having Jurisdiction. Where multiple authorities, having different code requirements, have jurisdiction over the work, conform to the most stringent requirements.

1.4 CODE STANDARDS

A. Fire doors shall conform to requirements of NFPA 80, Standards for Fire Doors and Windows.

B. Heating, ventilating and air conditioning work shall conform to requirements of NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.

1.5 REGULATIONS

A. Electrical work shall conform to applicable regulations of the State of Tennessee, Department of Insurance, Division of Fire Prevention and regulations of the local utility company.

1.6 MATERIAL AND TESTING STANDARDS

A. Components of the work shall conform to requirements of the American Society for Testing and Materials (ASTM) Standards, American National Standards Institute (ANSI)

Standards and Trade Association Standards, as listed in the various other sections of the specifications.

1.7 MANUFACTURER'S RECOMMENDATIONS

A. When work in accordance with the manufacturer's recommendation is specified, a copy of these recommendations shall be kept in the job office.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 42 00

SECTION 01 43 25
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 CONTRACTOR'S RESPONSIBILITIES

A. Employ and pay for the services of an independent testing laboratory, approved by the Designer, to perform specified services and testing. Employment of laboratory does not relieve Contractor's obligations to perform the Work of the Contract.

B. Coordinate and pay for inspections and testing required by law, ordinance, rules, regulations, orders, or approvals of public authorities as required by the Contract Documents.

1. Furnish copies of Products Test reports as required.

2. Furnish incidental labor and facilities to facilitate inspections and tests and for storage and curing of test samples.

3. Notify the lab sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

4. Make arrangements with lab and pay for additional samples and tests required for Contractor's convenience.

1.02 TESTING LABORATORY

A. Qualifications

1. Meet "Recommended Requirements for Independent Laboratory Qualification", published by the American Council of Independent Laboratories, and Basic requirements of ASTM E 329 "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".

2. Be authorized to operate in the State of Tennessee.

3. Submit copies to the Designer of the report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection with the memorandum of remedies of any deficiencies reported by the inspection.

B. Duties and limitations of authority

1. Perform specified inspections, sampling, and testing of materials and methods of construction and promptly submit five copies of the written report of each test and inspection to the Designer.

2. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, approve or accept portions of the Work, or perform duties of the Contractor.

END OF SECTION

01 50 00 TEMPORARY FACILITIES

1.1 DESCRIPTION OF REQUIREMENTS

1.1.1 This section specifies requirements for temporary services and facilities, including such items as temporary utility services, temporary construction and support facilities, and project security and protection. Refer to Section 00210 for additional requirements.

1.1.2 USE CHARGES: No cost or usage charges for temporary services or facilities are chargeable to the Owner or Architect/Engineer. The Construction Manager is responsible for these charges where indicated. In all other cases the Trade Contractor requiring same is responsible for the charges incurred. Cost or use charges for temporary services or facilities will not be accepted as a basis of claims for a change order.

1.2 PROTECTION OF EXISTING FACILITIES

1.2.1 Each Trade Contractor shall provide and maintain proper shoring and bracing for existing underground utilities, sewers, and building foundations encountered during his excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the new work, or can be properly backfilled upon completion of new work.

1.2.2 Each Trade Contractor shall provide and maintain proper shoring and bracing for existing structures and finishes encountered during the execution of his work to protect from collapse or other type of damage until such time as they are to be removed, incorporated into the new work, or can be properly backfilled upon completion of new work.

1.2.3 Each Trade Contractor shall provide and maintain temporary protection for new and existing work during the execution of his work to protect from dirt and damage. Any damage to new and/or existing work resulting from the lack of or inadequate temporary protection shall be this contractor's responsibility to restore.

01 51 00 TEMPORARY UTILITIES

1.1 TEMPORARY ELECTRICAL POWER & LIGHTING

Unless identified otherwise, the following provisions shall apply:

1.1.1 The temporary electrical power and lighting will be installed and maintained by the Electrical Trade Contractor (WC 28). The electrical Trade Contractor shall carry an allowance to pay for usage during the project.

1.1.2 All Trade Contractors shall obtain the power for their temporary electric requirements from the existing power source available on the site. All necessary lugs, transformers, disconnect switches, fuses, cable, posts, ground fault

interrupters, etc., required for connection to the power source and distribution, including wires, cable, supports, etc., shall be provided by Trade Contractor, all as coordinated and approved by the Construction Manager. The Electrical Trade Contractor shall pay for all reasonable amounts of power consumed for the temporary electrical service. Electric heaters will not be allowed for heating temporary trailers and offices.

1.1.3 Any electrical requirements for power or lighting beyond those listed in this paragraph shall be the responsibility of the Trade Contractor requiring them.

1.1.4 Overtime work requiring standby electricians shall be at the expense of the Trade Contractor requiring same. Installation of temporary electrical power and lighting shall be as scheduled by the Construction Manager.

1.1.5 Electric welder machines will not be allowed to be used without the express permission and approval of the Construction Manager and Owner. The Trade Contractor would have to pay for all equipment and materials required to provide the distribution and power supply if permission were granted to use electric welders, all as coordinated and approved by the Construction Manager.

1.1.6 All temporary electrical installations shall be in compliance with the latest National Electrical Code or OSHA, whichever is more stringent.

1.2 TEMPORARY HEAT

1.2.1 Unless identified otherwise, all equipment and labor for temporary heat after building enclosure shall be furnished by the Mechanical Trade Contractor (WC 27). Refer to Section 00210 to verify if energy will be supplied by the Owner when the heating equipment is connected to the existing power system.

1.3 COLD WEATHER PROTECTION

1.3.1 Unless identified otherwise, each Trade Contractor shall provide the temporary heat and protection necessary to allow his work to continue during cold weather. The building shall be considered to be enclosed when the exterior walls, roofing and temporary closures to all wall and roof openings are in place.

1.4 TEMPORARY TELEPHONE SERVICE

1.4.1 Each Trade Contractor shall provide temporary job site telephone service as required at his own expense.

1.4.2 Telephone numbers for summoning aid, such as the Police Department, the Fire Department, physicians, ambulances, and rescue squads from outside sources shall be conspicuously posted by the Construction Manager at the site of the work.

1.5 TEMPORARY POTABLE WATER SUPPLY

1.5.1 Unless identified otherwise, the Mechanical Trade Contractor (WC 27) shall

furnish, install, maintain, and remove if necessary, a temporary water supply system as required. Refer to Section 00210 to verify if Owner shall pay for water usage fees when connected to the Owner's existing system.

1.6 TEMPORARY TOILET FACILITIES

1.6.1 The Construction Manager shall provide and maintain adequate toilet facilities in a clean and sanitary condition for the use of all Trade Contractors. The use of chemical toilet facilities will be permitted.

1.7 FIRST AID

1.7.1 The Trade Contractor shall provide a completely equipped first-aid kit, which shall be readily accessible at all times and shall be provided and maintained at the site of the work in a clean and orderly condition. The required number of employees who have been properly instructed shall be designated to be in charge of first aid work. At least one such employee shall be available at all times that the work is in progress.

1.8 TEMPORARY FIRE PROTECTION

1.8.1 Each Trade Contractor shall be responsible for temporary fire protection related to his own work.

1.8.2 Unless identified otherwise, The General Trades Contractor (WC 20) shall furnish fire extinguishers in accordance with OSHA, as required for the building. Each Trade Contractor shall furnish fire extinguishers in accordance with OSHA requirements when his work required additional extinguishers.

01 54 00 CONSTRUCTION AIDS

1.1 HOISTING & SCAFFOLDING

1.1.1 All hoisting required in the performance of each Trade Contractor will be provided by that Contractor. If a crane is 125 tons or greater, or is a tower crane, only certified operators are allowed. Trade Contractor is responsible for providing required documentation of certification of operators PRIOR to start of work.

1.1.2 Each Trade Contractor shall provide his own scaffolding, which shall be in accordance with all OSHA safety requirements.

01 56 23 BARRIERS

1.1 TEMPORARY SITE FENCE

1.1.1 The temporary site fencing will be provided by the Construction Manager unless otherwise specifically noted.

1.2 TEMPORARY BARRICADES, TRAFFIC CONTROL & TRAFFIC LIGHTS

1.2.1 Each Trade Contractor is responsible for the maintenance and replacement (when removed) of all temporary barricades, traffic control, and traffic lights. In addition, each Trade Contractor shall be responsible for installation of temporary barricades in accordance with TOSHA requirements at openings created by that trade contractor.

01 57 00 SPECIAL CONTROLS

1.1 WORK INCLUDED: The work covered by this Section of the Specifications pertains to Special Controls.

1.1.1 LIMITING EXPOSURES OF WORK: Each Trade Contractor shall supervise performance of the work in such a manner and by such means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Such exposures include, where applicable, but not by way of limitation the following:

- Excessive static or dynamic loading.
- Excessive internal or external pressures.
- Excessively high or low temperatures.
- Thermal shock.
- Excessively high or low humidity.
- Air contamination or pollution.
- Water or ice.
- Solvents.
- Chemicals.
- Light.
- Puncture.
- Abrasion.
- Heavy traffic.
- Soiling.
- Bacteria.
- Insect infestation.
- Combustion.
- Electrical current.
- High speed operation, improper lubrication, unusual wear or other misuse.
- Incompatible interface.
- Destructive testing.
- Misalignment.
- Excessive weathering.
- Unprotected storage.
- Improper shipping or handling.
- Theft and Vandalism.

1.2 SPECIAL CONTROLS DESCRIPTIONS

1.2.1 SPECIFICATIONS BY REFERENCE: Where reference is made in the specifications to standards of any technical society, association, governmental agency, etc., said specifications or standards shall apply and be binding as though fully repeated therein and are to be considered as a part of these specifications.

1.2.2 RELATED WORK: The contractor shall conduct his work in a manner to prevent air, water, and noise pollution by establishing adequate controls during the construction operations. All controls shall be in accordance with the applicable laws of the State of Michigan.

A. AIR POLLUTION: The open burning of combustible wastes from clearing and grubbing operations and of waste construction materials will not be permitted. The Contractor shall dispose of all such wastes at sanitary landfill(s) licensed by the governing jurisdiction.

1) Dust Control: The contractor shall maintain all traveled areas in a safe, dust-free condition at all times. To accomplish this, the Contractor shall remove any tracked materials such as mud, dirt, etc. from construction and haul roads, furnish and apply chloride treatment to temporary roads, furnish and install temporary road patches or surfaces, or any approved methods or systems.

B. WATER POLLUTION: The contractor will be required to perform all construction operations in a manner that will conform to the requirements of Act 347, Soil Erosion and Sedimentation Control Act. Methods to be used are indicated herein (Items No. 1 thru No. 46) and referenced with numbers and symbols to the plans when special details are designated. The contractor shall also be required to perform all work in conformance with the requirements of Act 346, Inland Lakes and Streams. The permits for the construction will be obtained by the Owner, unless otherwise noted in the work category description.

C. NOISE POLLUTION: The contractor shall exercise judgment in the conduct of operations, which by nature result in excessive noise. All such operations shall be coordinated with the Construction Manager and Owner to avoid disruption to Owner operations.

D. CONSTRUCTION DEBRIS: All construction debris shall be removed from the construction site(s) at regular intervals and disposed of at sanitary landfill(s) licensed by State department having authority.

E. HOUSEKEEPING: The project work areas shall be maintained in a neat and clean condition and all debris and waste materials shall be removed from work areas on a daily basis.

F. PERMANENT HVAC SYSTEM: Mechanical Trade Contractor (WC 27), shall provide filter with MERV of 8 at each return air grille in system and

remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures.

1.2.3 VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL: The contractor shall be responsible for providing, installing, and maintaining vehicular and pedestrian traffic control signs, lights, and barricades in conjunction with construction operations where applicable. Vehicular traffic control measures shall be in accordance with the Michigan Manual of Uniform Traffic Control Devices.

A. STREET CLOSING: No street or roadway may be closed to traffic without prior written permission of the governing body having jurisdiction over the street or roadway.

B. EXISTING TRAFFIC CONTROL SIGNS: Existing traffic control signs which conflict with construction operations may be temporarily removed. The contractor shall provide traffic control for the duration of the sign displacement and signs shall be replaced in the proper location immediately after construction operations adjacent to the sign locations are completed.

END OF SECTION

SECTION 01 62 25
PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 Environmental Hazardous Products, Materials, or Wastes

A. Do not incorporate in the Work hazardous materials or products as currently defined in the Resource Conservation and Recovery Act of 1976 (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), or Environmental Protection Agency (EPA) regulations, rules, or requirements, as amended, and/or State and local regulations, rules, or requirements that are equivalent or more stringent than the Federal regulations, rules, or requirements unless the Contract Documents give no other option than to provide a material or product that contains a hazardous material, component, constituent, waste, or leachate. In studying the Contract Documents and carrying out the Work, report at once to the Designer the discovery of a product or material that contains or is suspected to contain hazardous materials, components, constituents, waste, or leachate. The Contractor will certify all equipment and materials used in fulfillment of their Contract Responsibilities are no Asbestos containing materials.

B. Do not incorporate in the Work a product or material that contains concentrations of a constituent, component, or material above the threshold levels which would require adherence to hazardous waste disposal regulations as currently defined, or could cause a release or threat of release of a hazardous substance at a level that would require a remedial response or removal action as currently defined by RCRA, CERCLA, or the EPA.

C. Select materials and products meeting specified requirements that comply with EPA provisions as regards hazardous materials content. In making requests for substitutions, determine that materials and products proposed for substitution comply with RCRA, CERCLA, and EPA requirements, and supply chemical constituent information and/or Material Safety Data Sheets (MSDS) with the substitution request.

1.02 Substitutions

A. Requests for substitutions shall be submitted to Designer on the form exhibited as Section 01 62 32, or in a similar format that provides the same or more information. Substitute products shall not be ordered or installed without written approval or acceptance from Designer. Contractor assumes all risks associated with premature ordering and installation of substitute products.

B. The specifically named manufacturers, products, and systems, and descriptive characteristics used in the Contract Documents normally serve only to establish a level of quality and a performance standard. Unless specific restriction is placed upon an item in the specifications, Contractor may submit proposals for substitutions. The Owner reserves the right to disallow substitutions. Contractor assumes risks associated with possible rejection of proposals for substitution submitted during the life of the contract.

C. Delays caused by tardiness of Contractor in preparing and forwarding submittals do not constitute an acceptable basis for consideration of substitute products. Delays due to factors that were in effect prior to project bidding do not constitute an acceptable basis for consideration of substitute products.

D. When making requests for substitutions, Contractor assumes the following responsibilities:

1. To have personally investigated the proposed substitute product and determined it is equal or superior in all respects to that specified;

2. To provide the same warranty for substitute that Contractor would for that specified;

3. To provide complete cost data, and waive all claims for additional costs related to substitution which subsequently become apparent; and,

4. To coordinate installation of the accepted substitute, making such changes as may be required for Work to be complete in all respects.

END OF SECTION

SECTION 01 62 32
SUBSTITUTION REQUEST FORM

To:	**Project:**
Attn:	
Specified Item:	**Proposed Substitute:**

1. The following are attached (Mark all that apply):

☐ **Complete Description** ☐ **Catalog**
☐ **Laboratory Tests** ☐ **Spec Data**

2. This substitution will have the following effects on dimensions, gauges, weights, etc.:

3. This substitution will have the following effects on wiring, piping, ductwork, etc.:

4. This substitution will have the following effects on other trades:

5. This substitution will have the following effect on construction Schedules:

6. The proposed substitute(s) differs from the specified product(s) in quality and performance as follows:

7. Manufacturers guarantees for the substitute(s) and the specified product(s) are (check one):

☐ **the same** ☐ **different** (if different, explain below)

8. Information on the availability of maintenance services and replacement materials for proposed substitute(s) is provided on an attached sheet if applicable. This attachment is:

☐ **attached** ☐ **not applicable**

9. Names, addresses, and phone numbers of fabricators and suppliers for proposed substitute(s) are provided on an attached sheet if applicable. This attachment is:

☐ **attached** ☐ **not applicable**

10. If the proposed substitution is accepted, it will result in:

☐ **no cost impact** ☐ **a cost increase of**
☐ **a cost decrease of** _____

(If change in cost is indicated, itemization on STREAM June 2014 Std 01 26 50 is attached)

11. License fees or royalties are pending on the proposed substitute.

☐ **No** ☐ **Yes** (if yes, explain below)

12. The undersigned or the firm represented shall pay for additional studies, investigations, submittals, redesign, and analysis by the Designer necessitated by this substitution request.

Substitutions must be requested in accordance with applicable Contract requirements. After bidding, substitutions are to be submitted only by Contractor. Substitute products should not be ordered or installed without written acceptance.

Submitted by: **Date:**
Sign here:

Name: **Telephone:**
type or print:

for: **E-Mail:**
Name of firm:

Address:
Street address:

and mailing address if different:

City, State, and Zip Code:

Designer's Review Comments:

☐ **Accepted** ☐ **Rejected**
☐ **Accepted as noted** ☐ **Rejected (received too late)**
☐ **Rejected (submittal incomplete)**

Additional comments:

For the Designer: **Date:**
Signature here: _____ _____

01 62 32

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:
   1. Division 02 Section "Selective Structure Demolition" for demolition of selected portions of the building.
   2. Divisions 02 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

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

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
   1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

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

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
   1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
   2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
      a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
      b. Restore damaged pipe covering to its original condition.
   3. Floors and Walls: Where walls or partitions that are removed extend from one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
      a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
   4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
   5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 REQUIREMENTS

A. To the maximum extent that is reasonably possible, keep the project site free of combustible material.

B. Debris and waste materials not claimed by the Owner prior to the Notice to Proceed shall become the property of the Contractor and shall be removed promptly from the project site before the start of construction.

C. All disposal of waste material shall be done in accordance with all applicable laws and regulations regarding such disposal.

D. Burning of waste material on the site is not permitted.

E. In addition to the cleaning specified in the Contract Conditions and the more specific cleaning that may be required in various sections of the Specifications, the building shall be prepared for occupancy by a thorough cleaning throughout, including washing, or cleaning by other approved methods, of surfaces on which dirt or dust has collected, and by washing glass on both sides. Provide and maintain adequate runner strips of non-staining polyethylene on finished floors as required for protection. Leave equipment in an undamaged, bright, clean and polished condition. Re-cleaning will not be required after the Work has been inspected and accepted unless later operations of the Contractor make re-cleaning of certain portions necessary.

F. Opon completion of the work, remove temporary buildings and structures, fences, scaffolding, surplus materials and rubbish of every kind from the project site.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 74 00

017419 CONSTRUCTION WASTE MANAGEMENT

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 administrative and procedural requirements for the following:

2. Salvaging non-hazardous demolition and construction waste.
2. Recycling non-hazardous demolition and construction waste.
2. Disposing of non-hazardous demolition and construction waste.

B. Related Sections include the following:

2. Division 1 Section "Summary of Multiple Contracts" for coordination of responsibilities for waste management.

2. Division 1 Section "Temporary Facilities and Controls" for environmental-protection measures during construction, and location of waste containers at Project site.

2. Division 02 Section "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements[, and for disposition of hazardous waste].

2. Division 02 Section "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

2. Division 04 Section "Unit Masonry" for disposal requirements for masonry waste.

2. Division 04 Section "Stone Masonry" for disposal requirements for excess stone and stone waste.

2. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE GOALS

A. General: Achieve end-of-Project rates for salvage/recycling of 95 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials

2. Demolition Waste:

a. Asphaltic concrete paving.
b. Concrete.
c. Concrete reinforcing steel.
d. Brick.
e. Concrete masonry units.
f. Wood studs.
g. Wood joists.
h. Plywood and oriented strand board.
i. Wood paneling.
j. Wood trim.
k. Structural and miscellaneous steel.
l. Rough hardware.
m. Roofing.
n. Insulation.
o. Doors and frames.
p. Door hardware.

q. Windows.
r. Glazing.
s. Metal studs.
t. Gypsum board.
u. Acoustical tile and panels.
v. Carpet.
w. Carpet pad.
x. Demountable partitions.
y. Equipment.
z. Cabinets.
aa. Plumbing fixtures.
bb. Piping.
cc. Supports and hangers.
dd. Valves.
ee. Sprinklers.
ff. Mechanical equipment.
gg. Refrigerants.
hh. Electrical conduit.
ii. Copper wiring.
jj. Lighting fixtures.
kk. Lamps.
ll. Ballasts.
mm. Electrical devices.
nn. Switchgear and panel boards.
oo. Transformers.

2. Construction Waste:
   a. Masonry and CMU.
   b. Lumber.
   c. Wood sheet materials.
   d. Wood trim.
   e. Metals.
   f. Roofing.
   g. Insulation.
   h. Carpet and pad.
   i. Gypsum board.
   j. Piping.
   k. Electrical conduit.
   l. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.
      7) Plastic pails.

1.5 SUBMITTALS

A. Comply with Section 017419.1 Waste Management Project Specific Plan or submit an equally comprehensive Waste Management Plan.

B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit three copies of report. Include the following information:

2. Material category.
2. Generation point of waste.
2. Total quantity of waste in tons.
2. Quantity of waste salvaged, actual in tons.
2. Quantity of waste recycled, actual in tons.
2. Total quantity of waste recovered (salvaged plus recycled) in tons.
2. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. HPBr Submittal: HPBr Online template for Credit MR 2.2, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.

H. Qualification Data: For Waste Management Coordinator and refrigerant recovery technician.

I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that

employs a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

2. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
2. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
2. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
2. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

A. General: Comply with Section 017419.1 Waste Management Project Specific Plan in the following section, or submit an equally comprehensive Waste Management Plan.

B. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

2. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
2. Total cost of disposal (with no waste management).
2. Revenue from salvaged materials.
2. Revenue from recycled materials.
2. Savings in hauling and tipping fees by donating materials.
2. Savings in hauling and tipping fees that are avoided.
2. Handling and transportation costs. Include cost of collection containers for each type of waste.
2. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

1.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Construction Manager. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

2. Comply with Division 1 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

2. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

2. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

1.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

2. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
2. Store items in a secure area until installation.
2. Protect items from damage during transport and storage.
2. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use:

2. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
2. Store items in a secure area until delivery to Owner.
2. Transport items to Owner's storage area designated by Owner.
2. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

F. Plumbing Fixtures: Separate by type and size.

G. Lighting Fixtures: Separate lamps by type and protect from breakage.

H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

1.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:

See Section 017419.1 Waste Management Project Specific Plan

C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to owner.

D. D. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

E. Procedures: Project will utilize a waste management company that will accept material "co-mingled" in a waste container and then sorted offsite. Separate containers for specifics types of materials may be used at some point at the sole discretion of the Construction Manager. Trade Contractors will be responsible to divert materials to appropriate containers at that time as directed without any change in cost.

1.4 RECYCLING DEMOLITION WASTE

A. Asphaltic Concrete Paving: Grind asphalt to maximum 1-1/2-inch size.

2. Crush asphaltic concrete paving and screen to comply with requirements in Division 2 Section "Earthwork" for use as general fill. Existing parking lot may be fractured and left in place.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

2. Pulverize concrete to maximum 1-1/2-inch size.
2. Crush concrete and screen to comply with requirements in Division 2 Section "Earthwork" for use as satisfactory soil for fill or sub-base.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

2. Clean and stack undamaged, whole masonry units on wood pallets. Fractured Masonry units to be placed in co-mingled container for recycling.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.

2. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

2. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.

I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

2. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

L. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

J. Conduit: Reduce conduit to straight lengths and store by type and size.

1.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

2. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
2. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
2. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

2. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

a. Comply with requirements in Division 32 Section "Exterior Plants." for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

1.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

2. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

Waste Management Plan

The Construction Manager has hired Waste Connections of Tennessee, Inc. to implement the Waste/Recycling Plan for this project. All reports will be generated and maintained through Waste Connections of Tennessee, Inc.

Project: Tennessee School for the Deaf

Contact: Justin Hall

Date: 9/4/15

1. Overview

1.1 General

The owner has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination or other factors shall be employed. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

1.2 Purpose of the Waste Management Plan

The purpose of this waste management plan is to:

1. Provide direction for the Construction Manager and subcontractors with regard to the handling of waste materials throughout the construction project.

2. Identify licensed haulers and processors of recyclables and markets for salvaged materials.

1.3 Goals of the Waste Management Plan

The owner has specified that at least **95%** of waste materials from this project be diverted from landfill disposal. This percentage is to be determined by weight.

2. Application of the Waste Management Plan

The strategies and procedures detailed in this plan shall be applied to the following waste products, should they be generated during construction:

- Clean dimensional wood, palette wood
- Plywood, OSB and particle board
- Engineered wood products
- Concrete
- Bricks
- Concrete masonry units
- General Unsorted Trash

- Asphaltic concrete
- Fiber cement products (shingles, panels, siding)
- Metals
- Asphalt roofing shingles
- Cardboard, paper and packing
- Unpainted gypsum drywall

3. *Waste Materials Handling and Disposal*

3.1 Approved Disposal Methods **(EXAMPLES BELOW- Replace with job specific recycling and/or disposal sites)**

Waste Materials	Where to Dispose
Dimensional lumber	Onsite Co-Mingled Container
Plywood, OSB	Onsite Co-Mingled Container
Engineered wood	Onsite Co-Mingled Container
Concrete	Demolish to pieces "football sized" or smaller and transport to stockpile for crushing by WC 02.
Bricks	Demolish to pieces "football sized" or smaller and transport to stockpile for crushing by WC 02.
CMUs	Demolish to pieces "football sized" or smaller and transport to stockpile for crushing by WC 02.
Asphaltic Concrete	Demolish to pieces "football sized" or smaller and transport to stockpile for crushing by WC 02.
Cardboard, paper	Onsite Co-Mingled Container
Fiber cement	Onsite Co-Mingled Container
Asphalt Roofing	Onsite Co-Mingled Container
Metals	Onsite Co-Mingled Container
Gypsum wall board	
General Unsorted Trash	Onsite Co-Mingled Container

3.2 Handling Procedures

The Contractor shall abide by the following special procedures:

Wood: Usable wood shall be stacked for reuse or donation. All other clean wood shall be stored in a container for recycling. Wood concrete forms are included in this instruction.

Concrete: The Contractor shall contact the chosen concrete recycler for instructions per rebar and other reinforcement.

All Reusable Materials: Clean materials in good condition shall be separated from those to be recycled and stored in such a way that will preserve their condition for donation.

4. *Job Site Training and Plan Implementation*

4.1 Plan Distribution and Instruction

The Contractor shall distribute copies of the Waste Management Plan to the Construction Manager and each Subcontractor. One copy of the plan shall be posted on the jobsite at all times. The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse and return methods to be used by all parties at the appropriate stages of the project.

4.2 Storage of Materials

All materials stored on-site shall be protected from inclement weather, breakage, contamination, etc. to minimize the amount of unnecessary waste generated during construction.

4.3 Separation Facilities

The Contractor shall create and clearly label a specific area to facilitate separation of materials for potential recycling, salvage, reuse and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

4.4 Hazardous Wastes

Hazardous wastes shall be separated, stored and disposed of according to local regulations.

5. *Submittals*

5.1 Progress Reporting

The Contractor shall submit a copy of the *Waste Management Plan Progress Report* with each Application for Progress Payment. Failure to submit the Progress Report shall render the Application for Payment incomplete and delay progress payment.

HPBr Miscellaneous Waste Diversion Form

Please fill out one of these forms for all materials that are removed from the site for reuse, resale or recycling. *Diverted Material* is any material that is not taken to the landfill and is reused. (Do not list materials that are diverted using the project dumpsters)

Diverted Material Description: _____

Quantity of Material:

_____

Estimated Weight of Material: _____

Material Taken To:

_____

Type of Material Reuse:

_____

Name: _____

Signature: _____

Organization: _____

Date: _____

SECTION 01 77 70
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUEST FOR CLOSE-OUT INSPECTION

A. SUBSTANTIAL COMPLETION: When Contractor considers Work substantially complete, Contractor shall submit to Designer:

1. Written assertion that Work is Substantially Complete;

2. A list of items to be completed or corrected and dates scheduled for completion or correction of each item;

3. Certification that orientation and training for facility maintenance personnel is complete or will be prior to inspection; and,

4. Written assertion that Operating and Maintenance Data Binders are complete and available or will be prior to inspection.

B. FINAL INSPECTION: When Contractor considers Work complete, Contractor shall submit to Designer:

1. Certification that a qualified person authorized by Contractor has reviewed the Contract Documents and inspected the Work;

2. Written assertion that the Work is complete and in accordance with Contract Documents and ready for Final Inspection;

3. Written assertion that additional materials necessary to augment the Operating and Maintenance Data Binders with instructions for adding these to the Binders, or full replacement Binders, are complete and available or will be prior to inspection; and,

4. Written assertion that Project Data Binders and Construction Record Documents are complete and available or will be prior to inspection.

C. Upon receipt of an appropriate request for close-out inspection, Designer will schedule an inspection meeting with Contractor, and Owner's representatives to determine the status of completion.

1.02 RESULTS OF CLOSE-OUT INSPECTIONS

A. Should the Designer determine that Work is not complete to the degree asserted by Contractor, Designer will promptly notify Contractor in writing stating the deficiencies. Contractor shall take immediate steps to remedy deficiencies and make a request for re-inspection.

B. SUBSTANTIAL COMPLETION: Designer will prepare a Certificate of Substantial Completion on AIA Document G704 accompanied by a list of items to be completed or corrected, and will submit Certificate to Contractor and to Owner for signature with an accounting of Liquidated Damages due, when Designer verifies that:

1. Work is Substantially Complete based on an inspection conducted pursuant to an appropriate request for close-out inspection;

2. Orientation and training for facility maintenance personnel is complete; and,

3. Operating and Maintenance Data Binders are complete and have been delivered to the Owner.

C. FINAL INSPECTION: Designer will certify that the Work is Complete, and will initiate Final Adjustments, when Designer verifies that:

1. Work is complete in accordance with Contract Documents based on an inspection conducted pursuant to an appropriate request for close-out inspection;

2. Orientation and training for facility maintenance personnel is complete; and,

3. Additional materials necessary to augment the Operating and Maintenance Data Binders with instructions for adding these to the Binders, or full replacement Binders, are complete and have been delivered to the Owner; and,

4. Project Data Binders and Construction Record Documents are complete and have been delivered to the Designer.

1.03 RE-INSPECTION FEES: If the Work fails a close-out inspection, and a subsequent inspection is requested and conducted based on Contractor assertion of the same stage of completion, Owner will compensate Designer for performing such re-inspection as additional services, and deduct the amount of such compensation from the Contract Sum by appropriate modification.

1.04 FINAL ADJUSTMENTS

A. When Designer has certified that the Work is complete, Designer will determine whether modification is needed to reflect appropriate adjustments to Contract Sum that were not previously effected. If such modification is needed, Designer shall prepare it and deliver it to Contractor, who in the case of a change order, shall sign and return it to Designer.

B. When Designer has certified that the Work and needed modifications to the Contract are complete, Designer will request that Contractor submit a final application for payment.

1.05 ONE (1) YEAR CORRECTIVE INSPECTION

A. A One (1) Year Corrective Inspection will be scheduled and conducted at project site prior to one (1) year from date Substantial Completion was achieved, but as close to the end of that year as is reasonably possible.

B. One (1) Year Corrective Inspection will be attended by at least one (1) representative each of Owner, Designer, and Contractor.

C. One (1) Year Corrective Inspection is intended to be an opportunity for Contractor to become aware of any outstanding corrections needed pursuant to the basic first-year warranty of Work.

END OF SECTION

SECTION 01 77 70.91
CONTRACT COMMISSIONING CLOSEOUT

PART 1 - GENERAL

1.01 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. All of the commissioning review and pre-functional testing shall be complete prior to substantial completion of the project and all functional testing shall be complete prior to Owner occupancy unless specifically approved in writing by the Owner. The Commissioning Agent ("CxA") is responsible for coordinating an issues list, documenting who is responsible for correcting or accepting each field condition or deficiency, including the responsibility for retesting. Deferred or alternate season testing will occur during the warranty period. Coordination with the Owner and Contractor for warranty testing, training or other issues is the responsibility of the CxA.

B. All Test and Balance ("TAB") work and all Owner system training must be complete prior to substantial completion, unless approved in writing by the Designer. Exceptions to this are planned HVAC, lighting or other control system training performed after occupancy and any required seasonal or approved deferred testing. Close-out for commissioned equipment and systems shall include, but are not be limited to, the following:

1. Completed and signed start-up and pre-functional checklist documentation;

2. Requested trend log data;

3. Submission of final approved TAB report;

4. Completion of all functional testing;

5. Required training of Owner personnel approved by the Owner and Designer and completed on site;

6. Submission of the approved operating and maintenance manuals; and/or,

7. All identified deficiencies and field conditions have been corrected or are accepted by the Owner or Owner's Representative and are determined by the CxA to be excepted from this milestone.

C. The Designer will determine the date of substantial completion after reviewing the CxA's recommendation for substantial completion.

D. Depending on the scope and size of the project, the CxA will work with the Owner and Designer to set the schedule for the one (1) year corrective inspection. If the project includes multiple buildings, locations or significant complexity, the commissioning team, as identified in Section 01 31 13.91 – Commissioning Coordination, is responsible for attending the inspection visit for the duration to cover all required systems and locations.

E. Commissioning activities are non-compensable and cannot be a cause for delay claims.

END OF SECTION

SECTION 01 78 21
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 DATA BINDERS

A. Provide one (1) complete set and two (2) CD's in portable document file (.pdf) format. Provide commercial quality, plastic covered, three ring binders. Identify project and type of data on face and side.

B. Provide information required by Contract Documents, including:

1. Cover sheet giving complete project title and number, Contractor's name, address, phone number, superintendent's name, and related information; and,

2. Table of Contents to identify material in Binders.

C. OPERATING & MAINTENANCE DATA BINDERS

1. Provide Product Data, including: manufacturer; model number; names, addresses, and telephone numbers of suppliers, installers, and servicers; related information for repair, renovation, or additions.

2. Provide Operating and Maintenance Data, including: instructions and schedules for proper operation, maintenance, servicing, and lubrication with manufacturer's parts list, illustrations, assembly drawings, maintenance diagrams, and list of recommended lubricants and cleaning agents; as-installed control diagrams and coordination drawings with color coded piping and wiring diagrams; valve tag charts with numbers, locations, and functions; panel board circuit directories; and, list of materials and parts furnished for Owner.

D. PROJECT DATA BINDERS

1. Provide required forms completed for supplying data on building systems or assemblies.

2. Provide a complete list of subcontractors and material suppliers, including dollar amount, company name, address, phone number, local representative, and information regarding diversity-owned business status. This information shall be submitted to Designer on the form exhibited as Section 01 78 88.

3. Provide Certificate of Substantial Completion, Use and Occupancy Permits, required TDEC permits, and Certificate(s) of Inspection or letter(s) of acceptance from governing authorities as apply.

4. Provide Contractor's warranty of the work.

5. Provide Guarantees, Warranties, Bonds, Certifications, Maintenance Agreements, service contracts, and related documents, including beginning date, duration, information about instances which might affect validity, and proper procedure in case of failure.

1.02 CONSTRUCTION RECORD DOCUMENTS

The record copy of Contract Documents and approved submittals required by paragraph 3.11 of the Conditions shall be kept in good condition for submittal to Designer upon completion of construction activity. In the course of the Work, Contractor shall legibly mark these documents to record actual conditions of Work, including: location, depth, and identification of new and existing underground items, location by dimension and identification of utilities, valves, tap points, equipment, service access, test points, and related features, field changes in dimensions and detail, changes by addenda, change orders, and construction change directives, description and details of features for maintenance, service, replacement, or expansion of the Work.

END OF SECTION

SECTION 01 78 26
FORM FOR ROOF DATA

Project: _____

_____

Project No.

Facility: _____

_____

General Information:

Designer: _____

Contact: _____ Phone: _____

Contractor: _____

Contact: _____ Phone: _____

Dates Installed From: _____ To: _____

3 Yr Bond No.: _____ Exp. Date: _____

Warranty No.: _____ Exp. Date: _____

Roof Area: _____ square feet

Roof Access: ☐Ladder ☐Hatch

Number of Sub-Roof Areas: _____

Construction:

Type: ☐New ☐Tear-Off ☐Re-cover

If Re-cover, Existing System:

_____

_____

Existing System, Tested for Asbestos: ☐Yes ☐No

If Yes, describe findings: _____

_____

_____

_____

Roof Deck:

☐Concrete: Thickness: _____

☐Poured ☐Precast ☐Plank

☐T-Beams ☐Lightweight

☐Other Concrete: _____

☐Wood: Thickness: _____

☐Plywood ☐Tongue & Groove

☐Steel: Gauge: _____

☐Gypsum: ☐Slab ☐Plank

☐Structural Woodfiber Type: _____

☐Other: _____

Roof Slope: _____ inches/feet

Gypsum Board: ☐No ☐Yes / Type: _____

Vapor Retarder: ☐No ☐Yes / Type: _____

Insulation Type:

☐None ☐Glass Fiber ☐Wood Fiberboard

☐Perlite ☐Phenolic ☐Polystyrene

☐Composite ☐Cellular Glass ☐Isocyanurate

☐Other: _____

Insulation Attachment:

☐Mechanical ☐Hot Asphalt ☐Adhesive

Average Thickness: _____ inches

Max.: _____ Min.: _____

Average Insulation R-Value: _____

Venting: ☐No ☐Yes/Type: _____

System Type:

Modified Bitumen

Application Type: ☐Hot Asphalt ☐Heat Welded ☐Cold Adhesive

EPDM Membrane: ☐.060 mil ☐.045 mil ☐Other

☐Ballasted ☐Fully Adhered ☐Mech. Fastened

Traffic Pads: ☐No ☐Yes/Type: _____

Base Flashings: Type: _____

Cant Strips: ☐Wood ☐Fiberboard ☐Metal ☐Other: _____

Perimeter Flashing: ☐Metal ☐Termination Bar ☐Other: _____

Penetration Flashing: ☐Metal ☐Pitch Pan ☐Preformed

Counterflashing: ☐None ☐Thru-Wall ☐Reglet

Coping/Fascia: ☐No ☐Yes/Type: _____

Form Completed

By: _____

Date: _____

SECTION 01 78 36
ROOFING SYSTEM WARRANTY

GENERAL INFORMATION	
General Contractor (name & address): Contact:	***Building** (identification & location): **Bldg Owner**: State of Tennessee
Designer (name & address):	**Roofing System installed under project number:** **SBC Project No.**
Contract Conditions: AIA Document A201-1997	Roof Substantial Completion Date:
Designer's Roof Cost Estimate:	Length of Warranty Term: ☐ 20 Years ☐ Other: Base Wind Speed ☐ 70 MPH ☐ Other:
☐ New Roof or ☐ Re-roof	Roof Warranty Expiration Date:

ROOFING SYSTEM COMPONENTS INCLUDED UNDER THIS WARRANTY	
☐ Membrane	☐ Metal Flashings and Perimeter Metal Work
☐ Membrane Accessories	☐ Metal Copings (Lineal Ft)
☐ Expansion Joints	☐ Insulation
☐ Membrane Flashing	☐ Metal Roof, Components, and Finish

ROOFING SYSTEM INFORMATION	
Membrane Manufacturer (Name & Address) **Factory Location:**	**Roofing Contractor** (Name & Address) Contact:
Manufacture Date: **Rolls:**	**Type of Membrane & Attachment:**
	Square Feet of Roofing Installed:
	Type of Deck:
Roofing Systems Company (name & address): Contact:	**Type of Insulation:**
	Type of Flashing:
	Lineal Feet of Flashing Installed
Roof approved by (**Company's** Representative):	**Warranty Number**:

The Roofing System Company ("Company"), its heirs, executors, administrators, successors, and assigns, jointly and severally, warrant to the Building Owner ("Owner") of the building identified above, that subject to the terms, conditions and limitations stated herein, the Company will repair or cause to be repaired, any leak(s) in the roofing system attributable to deficient workmanship or defective materials as necessary to return the roofing system to a condition which is watertight. The aggregate repair cost incurred by the Company over the term of this warranty shall not exceed the Owner's original cost of the installed roofing system. The term of this warranty is as set forth in the "General Information" on page one, commencing with the date of substantial completion of the roofing system installation. The roofing system shall be installed and repaired, if necessary, by a roofing applicator authorized by the Company. Contractor, as used herein, shall mean the Contractor having privity of contract with the Owner for the subject roofing system installation as identified by Article 3 and including those entities for which the Contractor is responsible as set forth by Subparagraph 3.3.2 of the Conditions of the Contract for Construction, as identified in the "General Information" on page one.

TERMS, CONDITIONS, AND LIMITATIONS

1. Owner shall provide the Company with written notice within thirty (30) days of the discovery of any leak(s) in the roofing system.

2. The Company shall within fifteen calendar days, commencing with receipt of written notice from the Owner, inspect the roofing system (in the presence of the Owner) and if the cause(s) of the leak(s) is found to be the responsibility of the Company under this warranty, promptly make or cause to be made, any repair(s) or replacements(s) necessary to return the roofing system to the condition which is watertight. All repair expenses incurred in connection herewith will be the responsibility of and borne by the Company.

3. If upon joint inspection of the roofing system as provided in Paragraph 2, the cause(s) of any leak(s) is found not to be the responsibility of the Company under this warranty, the Company will immediately advise the Owner of the type and extent of repair(s) required to be made at the Owner's expense and if such repair(s) be promptly and reasonably made, this warranty will remain in effect for the unexpired portion of the warranty period; otherwise, this warranty will become null and void with respect to the area(s) or item(s) affected.

4. In the event the Company and Owner disagree as to the cause(s) and responsibility of the leak(s), then the Owner, without prejudice to any other remedy Owner may have, may make permanent repair(s) of any leak(s) in accordance with Company recommendations if timely made available. Such action by the Owner shall not constitute a violation of this warranty. The Owner reserves the right to pursue reimbursement from the Company for all cost(s) and expense(s) of such repair(s), subject to the Company's responsibility under this warranty. If it is determined that the Company has no responsibility for the leak(s) under this warranty, the Owner will reimburse the Company for direct expenses encountered for all trips requested by the Owner after the initial inspection.

5. In the event an emergency condition arises where, in the reasonable opinion of the Owner immediate reasonable repair(s) are necessary to avoid substantial damage to the building or its contents and the Company advises the Owner in writing of its inability, for reasons beyond its control, to inspect and repair the roofing system as necessary within fourteen (14) days of written notification from the Owner, then the Owner may make such temporary repair(s) as in the opinion of the Owner are essential and necessary and such action by the Owner shall not constitute a violation of this warranty. In these circumstances, the Company shall reimburse the Owner for all reasonable costs and expenses of such temporary repair(s) subject to the Company's responsibility under this warranty.

6. In the event the Company fails to respond to written notification of known or suspected leak(s) as provided in Paragraph 2, the Owner may, after fourteen (14) days following receipt by the Company of an additional written notice and without prejudice to any other remedy he may have, make permanent repair(s) of any leak(s) and recover all costs and expenses of such repair(s) from the Company. The Company will, upon demand by the Owner, promptly reimburse the Owner these repair costs and expenses. Such action by the Owner shall in no way negate the responsibilities of the Company under this warranty for the unexpired portion of the warranty period.

Warranty Number:

7. Except as provided in Paragraphs 4, 5 & 6, any alterations of the roofing system after completion and acceptance including the placement of fixtures, utilities and equipment on or through the roof or additions thereto, will render this warranty null and void with respect to the area(s) or item(s) affected unless prior approval of such alterations of the roofing system or additions thereto is given by the Company. Such approval will not be unreasonably withheld.

8. This warranty shall not be applicable to the extent the roofing system sustains damage(s) by any of the following:

(a) Acts of God and natural disasters, including but not limited to lightning, gales, hurricanes, tornadoes, and earthquakes;

(b) Acts of negligence (whether of omission or commission), fire, accidents, or misuse, including but not limited to vandalism, civil disobedience, or acts of war, provided same are not caused by the Company and/or the Contractor;

(c) Failure by the Owner or Lessee to use reasonable care in maintaining the roof and appurtenances, provided same caused the leak(s) or item(s) affected; or,

(d) For built-up and modified bitumen roofing systems: A roof design or specification approved by the Owner with less than 1/8" per foot slope for drainage.

9. When the roofing system has been damaged by any of the foregoing causes, repair(s) shall be at the Owner's expense and such repair(s) shall be made as provided in Paragraph 3; otherwise, this warranty will become null and void with respect to the area(s) or item(s) affected.

10. Until such time as the third year of this warranty has expired, the Company's obligations hereunder shall be joint and several with the Contractor. For the purpose of this paragraph, all of the Contractor's actions, whether of omission or commission, that are subject to this warranty are likewise the actions of the Company hereunder and shall in no way negate or reduce the responsibilities of the Company under this warranty.

11. The Company shall maintain accounting records of warranty repair costs in conformity with generally accepted accounting principles for the term of his warranty, and such costs shall be subject to audit at any reasonable time and upon reasonable notice by the Owner or the Tennessee State Comptroller of the Treasury, or their duly appointed representatives, or a licensed independent public accountant. Warranty repair costs by the Company or the Contractor, as applicable, shall be maintained with a complete itemization of costs of all work identifying labor, materials, equipment, and overhead.

12. The Company certifies that it:

(a) Manufacturers or purchases products for the purpose of designing, developing, and marketing a roofing system;

(b) Provides recommendations, specifications, and details for the roofing system materials and installation;

(c) Trains and approves applicators;

(d) Provides technical assistance to applicators;

(e) Approves or prepares shop drawings; and,

(f) Provides a technical representative employed by the Company for the final inspection, and to all inspections required by this warranty.

13. During the period of this warranty, the Company, its agents or employees, will have free access to the roof during regular business hours of the Owner.

by **ROOFING SYSTEMS COMPANY**	
Company name:	
Authorized signature:	
Name & title:	
	Warranty Number:

01 78 36

SECTION 01 78 88
REPORT OF SUBCONTRACTORS AND SUPPLIERS

Project	SBC Project Number	Page
		of

Use first entry on first page for General Contractor

Work performed or Material Supplied, and Dollar Value	Firm name and address	Principal Contact and Phone	Minority-Owned Business? If "Yes", provide classification and certifying agency
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____
			☐ **Yes** ☐ **No** ☐ Women Business Enterprise ☐ Small Business Enterprise ☐ Minority Business Enterprise ☐ Service-Disabled Veteran Business Enterprise Cert. Agency: _____

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 COORDINATION

A. Coordinate schedule of demonstration and training with Designer and Owner's personnel for all installed equipment and systems.

B. If conditions (such as season of year) do not allow for a complete demonstration or training of equipment and systems operation during one meeting session; then coordinate a schedule that shall provide a sufficient number sessions within the warranty period.

1.02 SUBMITTALS

A. Submit an agenda for instruction of Owner's personnel on installed equipment to Designer not less than one week prior to the scheduled instruction. State number of hours of training time to be provided for each agenda item. State the names and qualifications of persons to provide instruction.

B. For each training event performed, submit two (2) DVD copies documenting the training event with Project Data Binders. Submit each DVD in a standard protective hard plastic container. Label both the DVD *and* the container to include the full project title and short description of training documented.

C. Submit lists of persons witnessing equipment and systems demonstration, and persons receiving operating instruction. Include copy of lists in the Project Data Binders.

D. Submit lists of spare materials and parts furnished to Owner. Include on lists a written assertion of receipt by Owner's personnel responsible for receiving the materials and parts.

E. Submit lists of Contractor's Service Personnel who are to be contacted if problems arise with installed equipment or systems. Personnel named must be familiar with installed equipment and systems. Submit updated lists through the duration of the Warranty period, as needed, if Contractor's Service Personnel changes.

PART 2 - PRODUCTS

2.01 DVD's shall be:

A. Format: Provide "Standard DVD" format, and

B. Grade: Provide "Standard DVD" grade.

PART 3 - EXECUTION

3.01 GENERAL

A. Conduct initial demonstration and training as soon as practicable upon installation, and prior to Substantial Completion inspection.

B. Substantial Completion shall not be certified, nor shall Owner be required to assume responsibility for operating, maintaining, or insuring system, prior to initial demonstration and training.

3.02 DEMONSTRATION

A. Demonstrate operation of installed equipment and systems to Designer and to Owner's representative. All dependent systems must be demonstrated as being operationally coordinate (such as energy management controls coordinate with mechanical equipment.)

B. Demonstration shall be complete and detailed; referencing manufacturer's printed operating and maintenance instructions, and evidencing all required design specifications.

3.03 TRAINING

A. All training shall be specific to the actual-installed equipment and systems, and be performed by persons approved by equipment manufacturer(s) and/or approved by Designer to conduct such training.

B. Instruct Owner's personnel with overall equipment and systems assembly and function; using assembly drawings and diagrams which are specific to the actual-installed equipment and systems.

C. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems; using the manufacturer's printed operating and maintenance data that is specific to the actual-installed equipment and systems as the basis of instruction.

D. Verify that Owner's personnel has received all spare materials and parts required to be furnished, and provide instruction in replacement procedures.

E. Record the entire training event

1. Upon initiating recording of an event, camera operator shall announce as a part of the sound recording the date, time, and event being recorded. Operator may take full liberty to provide a narration of the event being recorded.

2. Recording shall be of sufficient quality to provide overall undistorted shading, contrast and focus, and to provide an adequate degree of magnitude so that the event being recorded can be clearly discerned by the viewer.

3. Upon Designer approval, an equipment manufacturer-prepared training DVD which complies to the requirements of this section may be substituted in lieu of recording the actual training session provided for that particular equipment.

F. Approximately thirty (30) days from initial training event, and subsequent other training events, if required, provide a follow-up training event with Owner's personnel; addressing questions and concerns which have arisen since the initial training (no recording is required).

END OF SECTION

SECTION 01 81 13 – SUSTAINABLE DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 REFERENCES, DEFINITIONS, PROCESS

A. Reference: Tennessee High Performance Building Requirements: Manual. http://tn.gov/assets/entities/generalservices/stream/attachments/HPBr_Documents.pdf.

B. Definitions are found in the HPBr Manual.

1.2 REQUIREMENTS

A. Site Disturbance
1. Install and maintain Best Management Practices (BMP's) during land disturbing activities in accordance with the Tennessee Erosion Sediment Control Handbook provided by the Tennessee Department of Environment and Conservation (TDEC).

B. Construction Waste Management
1. Contractor shall develop a waste management plan to include a plan to address procedure for sorting, hauling, and tracking rate of recyclables from construction site, address training of onsite personnel to ensure participation in program, and address owner and project specific concerns.
2. Contractor to provide documentation during construction that 75% of construction debris shall be diverted from the landfill to be salvaged or recycled.

C. Sustainable Materials – Recycled Content
1. Design intent is to achieve 10% recycled content.
2. All material submittals shall identify percentages of recycled material by weight and identify post-consumer and post-industrial recycled content.
3. This credit excludes mechanical, electrical, and plumbing equipment.
4. As a requirement for Final Payment, submit to the Designer a Materials Table in the format provided in the HPBr Materials and Resources Calculator (TN HPBr Appendix B).

D. Sustainable Materials – Tennessee Produced Materials
1. Design intent is to achieve 10% Tennessee produced materials by cost.
2. All material submittals shall identify products harvested and manufactured in the state of Tennessee. If a product is only harvested or manufactured in the state of Tennessee, 50% of the material cost will be counted.
3. This credit excludes mechanical, electrical, and plumbing equipment.
4. As a requirement for Final Payment, submit to the Designer a Materials Table in the format provided in the HPBr Materials and Resources Calculator (TN HPBr Appendix B).

E. Sustainable Materials – Regional Materials
1. Design intent is to achieve 20% regional materials.

2. All material submittals shall identify products harvested and manufactured within 500 miles of the project site. If a product is only harvested or manufactured within 500 miles of the project site, 50% of the material cost will be counted.
3. This credit excludes mechanical, electrical, and plumbing equipment.
4. As a requirement for Final Payment, submit to the Designer a Materials Table in the format provided in the HPBr Materials and Resources Calculator (TN HPBr Appendix B).

F. Air Quality Management – During Construction
1. Meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning Contractors National Association (SMCNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
2. Protect stored on-site or installed absorptive materials from moisture damage.
3. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return grille. (The procedure for determining MERV ratings is contained in ASHRAE 52.2-1999.) Replace all filtration media immediately prior to occupancy.
4. Contractor to issue plan for storage of on-site absorptive materials.
5. Contractor to issue plan and submittals for filtration media and use of air handlers during construction.
6. As a requirement for Final Payment, submit to the Designer a written confirmation of compliance with these requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 81 13

Materials and Resources Calculator

TN HPBr Appendix B

Instructions

Complete the table below with construction materials items, their associated costs, and percent by weight or volume of recycled content (pre and post-consumer).

Materials Table

Description of Material		Total Construction Cost	Labor Cost	Equipment Cost	Material Cost (Less Labor & Equipment)	Resource Reuse (MR3.6)	Recycled Content (MR3.1 & MR3.2)			Rapidly Renewable Materials (MR3.7)	Regional Materials (MR3.5)		Tennessee Produced Materials						
													Non-wood Materials (MR3.3)				Wood Materials (MR3.4)		
							Post-Consumer	Pre-Consumer	Net Value		Regional Materials	Value	Non-wood Materials	Harvested AND Manuf. in TN	Harvested OR Manuf in TN	Value	Harvested AND Manuf. in TN	Harvested OR Manuf in TN	Value
		[$]	[$]	[$]	[$]	[$]	[%] by weight	[%] by weight	[$]	[$]	[%]	[$]	[%]	[%]	[%]	[$]	[%]	[%]	[$]
Division																			
03	CONCRETE				0	0			0			0				0			0
04	MASONRY				0				0			0				0			0
05	METALS				0				0			0				0			0
06	WOOD, PLASTICS & COMPOSITES				0				0			0				0			0
07	THERMAL / MOISTURE PROTECTION				0				0			0				0			0
08	DOORS & WINDOWS (OPENINGS)				0				0			0				0			0
09	FINISHES				0				0			0				0			0
10	SPECIALTIES				0				0			0				0			0
	TOTAL	$0	$0	$0	$0	$0			$0	$0		$0				$0			$0

		Points
Percentage of Recycled Content (MR3.1 & MR3.2)	0%	0
Percentage of Tennessee Non-wood Materials (MR3.3)	0%	0
Percentage of Tennessee Wood Materials (MR3.4)	0%	0
Percentage of Regional Materials (MR3.5)	0%	0
Resource Reuse Percentage (MR3.6)	0%	0
Rapidly Renewable Materials Percentage (MR3.7)	0%	0

SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Commissioning is a quality-focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all its systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the Owner's Operational Performance Requirements as defined in the Contract Documents.

B. The purpose of commissioning is to provide a systematic process of assuring by verification and documentation, from the design phase to a minimum of one year after construction, that all facility systems perform interactively in accordance with the Contract Documents and their intent.

1.2 RELATED DOCUMENTS

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

B. Commissioning Plan

1.3 INCLUDED SYSTEMS

A. The following systems, equipment and their components are included in the scope of the commissioning activities and are considered to be commissioned systems and equipment.
1. Heating, Ventilating and Air Conditioning (HVAC) Systems
2. Plumbing Systems
3. Building Automation and Control System (BACS)
4. Lighting (Interior and Exterior) Systems
5. Electrical Systems

1.4 ROLES AND RESPONSIBILITIES

A. Commissioning Authority (CxA): The Commissioning Authority is an individual who leads, reviews and oversees the completion of the commissioning process activities.

B. General Contractor (hereafter referred to as "Contractor")
1. The Contractor shall be responsible for adhering to applicable code required procedures, standards and industry practices to ensure personal safety, the safety of others, and facility safety. If there are procedures in the checklists or the functional performance tests which conflict with safety, the Contractor shall

not proceed and shall notify the CxA immediately.

2. The Contractor shall be responsible for the quality of construction.
3. The Contractor shall be responsible for communicating to the CxA the construction schedule, milestones, completion schedules, planned testing, etc., including updates in the same fashion, timeliness and level of detail as is provided to the Owner.
4. The Contractor shall incorporate commissioning-related activities into the overall project schedule.
5. The Contractor shall make record drawings readily available for review and use by the CxA at any time during normal business hours.

C. Subcontractors

1. The HVAC Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the HVAC systems.
2. The Plumbing Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the plumbing systems.
3. The Building Automation Controls Subcontractor, BACS shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the BACS.
4. The Electrical Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the electrical systems.

PART 2 - PRODUCTS

2.1 MEANS OF ACCESS

A. The Contractor and/or Subcontractors shall provide means for the CxA to access, observe and visually confirm proper operation of all equipment and systems. These means shall be in compliance with all OSHA and job-site safety regulations.

2.2 TEST EQUIPMENT

A. The Contractor and/or Subcontractors shall provide the necessary equipment to fully test the commissioned systems as defined in the functional performance test procedures to be provided by the CxA.

B. The test equipment shall meet the following minimum requirements.

1. All test equipment shall be in good mechanical and electrical condition.
2. Field test metering used to check power system meter calibration shall be more accurate than the instrument being tested.

3. Accuracy of metering in test equipment shall be appropriate for the test being performed.
4. Waveshape and frequency of test equipment output waveforms shall be appropriate for the test and the tested equipment.

C. Calibration
1. Calibration of all test equipment shall be current.
2. Calibration accuracy shall be traceable to National Institute of Standards and Technology (NIST).
3. Test equipment shall be calibrated in accordance with the following schedule.
   a. Field instruments
      1) Analog – At least every 6 months
      2) Digital – At least every 12 months
   b. Leased Specialty Equipment – At least every 12 months
4. Dated calibration labels shall be visible on all test equipment.
5. Calibration records shall be provided for all test equipment used in the project.

PART 3 - EXECUTION

3.1 COMMISSIONING TEAM

A. The Contractor and each Subcontractor shall designate an individual to be responsible for coordinating commissioning activities with the CxA. This requirement is intended to facilitate effective communication during the commissioning process.

B. The commissioning team consists, at a minimum of the following:
1. Owner
2. Program Manager
3. Commissioning Authority
4. Architect
5. Design Engineers (Mechanical, Plumbing, Electrical, Specialty)
6. General Contractor
7. Mechanical Subcontractor(s) and its Subcontractors
8. Plumbing Subcontractor(s) and its Subcontractors
9. BACS Subcontractor(s) and its Subcontractors
10. Electrical Subcontractor(s) and its Subcontractors
11. TAB Subcontractor

3.2 COMMUNICATION PROTOCOLS

A. Formal reports including Site Observation Reports will be distributed to the Owner, Program Manager, Architect, Design Engineers, and General Contractor.

B. Informal comments and observations from the commissioning work will be relayed directly to the responsible party whenever possible, with copies to the Owner, Program Manager, Architect and General Contractor. This

includes field observations and functional performance test results. The direct communication approach will avoid delays from traditional remote paper exchanges, will encourage dialogue and discussion of options and alternatives, and alternatives, and generally maintain an atmosphere of cooperation and quality.

C. Response Times
1. Timeliness in delivering information or providing responses to the CxA is essential to providing the construction product to the Owner on time, as well as facilitating the commissioning process.
2. The Contractor shall adhere to the following to meet this objective:
a. Delivery of proposed training material to CxA: Thirty (30) days prior to the scheduled training
b. Written response to a site observation comment to CxA: Five (5) days or less from receipt of comment, if possible.
c. Time to correct discrepancies noted in Record Drawings during construction phase: Two (2) weeks from the date the discrepancy was noted
3. The CxA shall respond, in writing, to questions from the Contractor within five (5) working days.

3.3 COMMISSIONING MEETINGS

A. Commissioning issues will be handled during project meetings which will be scheduled bi-weekly or less, unless agreed to by both the CxA and Contractor. If specific topics require additional discussion, the appropriate parties shall meet immediately after the project meeting or at another time mutually agreed to by those parties.

3.4 SUBMITTAL REVIEW PROCEDURES

A. The Contractor shall provide a copy of each submittal defined for the systems to be commissioned to the CxA at the same time as providing the submittal to the Architect.

B. The CxA will review the submittals for information only (approval not required) parallel to the Engineer’s review.

3.5 FIELD OBSERVATIONS AND VERIFICATIONS

A. The CxA will make field observations from time-to-time. The CxA field observation reports may include construction issues, access and maintenance issues, safety issues, or other issues.

B. The Contractor shall respond, in writing to the CxA and/or the Owner, to each contractor-responsible issue within five (5) calendar days of receipt of the site observation report. The response shall state at a minimum the following.
1. Concurrence or not on whether this is an issue
2. Planned corrective action
3. Date on when correction will be completed

C. The Contractor shall respond in writing when the corrective action has been completed and in its opinion the issue is resolved.

3.6 EQUIPMENT AND SYSTEM CHECKLISTS

A. The Commissioning Authority will provide the Contractor the following types of equipment checklists (alternatively, the Contractor may submit its own checklists to the CxA for review and approval in lieu of using those provided by the CxA):
   1. Equipment Installation Checklist
   2. Milestone Checklist

B. Intent
   1. The Equipment Checklists will be used to communicate the readiness for a particular equipment or system for the schedule milestone.
   2. The checklists do not contain all of the requirements of the Contract Documents. The completion of the checklist does not eliminate the Contractor's responsibility for meeting other requirements in the Contract Documents.
   3. Equipment Installation Checklists are used to document that the equipment is installed per the contract documents. This checklist should be completed when the equipment is installed with permanent supports in place, electrical wiring complete, and all duct and/or piping is installed.
   4. The CxA will work with the contractor to identify commissioning related milestones. The Milestone Checklists will be used to communicate the readiness for a particular equipment or system for the schedule milestone.

C. Use and Process
   1. Equipment checklists will be provided to the Contractor by the CxA for all equipment to be commissioned.
   2. The Contractor shall refer to the Commissioning Plan to obtain the checklists.
   3. The Contractor shall complete each checklist. The Contractor shall document and explain any negative responses to any line item of the checklist at the end of the checklist.
   4. As each checklist is completed, the Contractor shall provide the original to the CxA and maintain a copy on site.
   5. The CxA shall have a minimum of five (5) working days to verify at his discretion whether the checklists have been completed satisfactorily before scheduling of any functional performance tests related to that equipment.

3.7 FUNCTIONAL PERFORMANCE TESTING

A. General
   1. The Contractor and appropriate Subcontractors shall demonstrate that the commissioned equipment and systems operate properly in all modes of operation.

2. Testing shall begin at the component level and progress upwards in complexity to the equipment and system level.
3. When all systems have passed their functional performance tests, the Contractor and appropriate Subcontractors shall demonstrate that the systems operate correctly as a whole in a System Integration Test.

B. Functional Performance Test (FPT) Procedures
1. The Contractor shall provide all documentation as requested to the CxA for development of functional performance testing procedures. This documentation shall include, at a minimum, manufacturer installation, start-up, operation and maintenance procedures. The CxA may request further documentation as necessary for the development of functional performance tests.
2. The FPT procedures will be provided to the Contractor by the CxA prior to testing for review.
3. The Contractor shall refer to the Commissioning Plan for draft FPT procedures.
4. The Contractor and Subcontractors shall review the FPT procedures and reply, in writing, whether the tests as written are acceptable, meet the installed conditions, and will not void any warranties. The Contractor shall provide any requested modifications to the test procedures in writing to the CxA for consideration. No reply from the Contractor within four (4) weeks of its receipt of the FPT procedures signifies the Contractor's and Subcontractors' concurrence that the procedures are acceptable.
5. The FPT procedures will provide step-by-step instructions in a pass/fail format.

C. When the equipment and systems are ready to test, the FPT will be scheduled for a time in accordance with the project completion schedule.
1. Functional performance testing is intended to begin upon completion of a system.
2. Functional testing may proceed prior to the completion of the system at the discretion of the CxA and the Contractor.

D. The Contractor shall place equipment and systems into operation and continue the operation as required during each working day of the testing activities

E. The Contractor shall accomplish the functional performance testing of equipment based on procedures developed by the CxA and as reviewed by the Contractor.
1. The Contractor shall provide skilled technicians to operate the systems during functional performance testing. At a minimum, the contractor shall provide one trade technician familiar with the system being tested.
2. The Contractor shall provide means of access to the CxA to visually verify all aspects of the specified test.
3. The Contractor shall correct any deficiencies identified during testing and retest equipment as required.

F. If a minor problem is discovered during the test (a problem requiring 45 minutes or less to resolve), the Contractor shall correct the problem and continue on with the test.

G. If a major problem is discovered during the test, (a problem requiring greater than 45 minutes to resolve), the test shall be considered failed and retesting will be required. The test must be repeated in its entirety. Prior to retesting, the Contractor shall submit to the CxA the required data indicating that the deficient item(s) have been corrected. After review of this information by the CxA, a retest will be scheduled.

If more than one functional performance test is required for any type of equipment or system due to Contractor's failure, or issues that the Contractor had direct or indirect control over, the costs for the CxA to witness retesting of similar types of equipment until satisfactory results are obtained shall be the responsibility of the Contractor. The CxA shall determine what the nature of the failure is.

1. A major problem is any problem or group of problems that require more than forty-five minutes to correct.

H. Re-testing: During the course of the retest, if at any point a major deficiency is discovered, the test will be stopped. Repeat tests until acceptable results are achieved.

I. Deferred Testing: The Contractor shall provide labor, equipment and materials to perform any functional testing that must be deferred past the date of final completion in order to properly perform the test. Acceptable reasons for deferring a test shall include the following:

1. Specific climatic conditions are necessary to properly demonstrate the functionality of the equipment or system.
2. Work to be conducted under a subsequent phase of the Project is not complete per the contractual Detailed CPM Project Schedule.

3.8 TRAINING VERIFICATION

A. The Contractor shall submit proposed training material to the CxA for review and comment.

B. The Contractor for the respective system shall be responsible for the development and implementation of the training material for that system.

C. The Contractor shall provide final Operation and Maintenance (O&M) manuals and training materials to the Owner and CxA prior to training.

D. At a minimum, the Contractor shall provided the following material at the time of training:

1. Detailed agenda
2. Contractor contact information sheet
3. Detailed training material (divided by sections where appropriate)
4. Log sheets and maintenance checklists
5. Training may be recorded for future reference if requested by the

Owner.

E. The Contractor shall develop a proposed training schedule and submit that to the Owner for review, comment and approval.

F. The Contractor shall schedule and coordinate all training sessions through the Owner.

G. At a minimum, training topics shall include the following:
1. Description of equipment and systems
2. Warranties and guarantees
3. Equipment start-up and shutdown
4. Normal and emergency operation
5. Seasonal changeover
6. Maintenance schedules
7. Health and safety issues
8. Special tools and spare parts
9. Emergency procedures
10. Hands-on operation
11. Troubleshooting
12. O&M manuals
13. Facilities control system and sequences of operation

END OF SECTION 01 9113

SECTION 02 41 19 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of building or structure.
   2. Owner to make drawings available, upon request, of the existing buildings where demolition is shown to occur.

B. Related Sections include the following:
   1. Division 01 Section "Summary" for use of premises and Owner-occupancy requirements.
   2. Division 01 Section "Temporary Facilities" for temporary construction and environmental-protection measures for selective demolition operations.
   3. Division 01 Section "Cutting and Patching" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Predemolition Conference: Conduct conference at Project prior to starting demolition work.

1.5 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary

services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

2. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. The architect must be contacted prior to use of demolition tools and equipment causing vibrations through the structure of the building.
   3. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   5. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting

operations. Maintain portable fire-suppression devices during flame-cutting operations.

6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
   4. Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 15 13 – PVC WATERSTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Provision of waterstops embedded in concrete and spanning control, expansion, and/or construction joints to create a continuous diaphragm to prevent fluid migration.

B. Non-metallic waterstops for use in concrete joints subjected to chlorinated water, seawater, and many waterborne chemicals.

1.3 QUALITY ASSURANCE

A. Waterstop manufacturer shall demonstrate five years (minimum) continuous, successful experience in production of waterstops.

B. PVC WATERSTOP
   1. Corps of Engineers: CRD-C 572-74
   2. American Society for Testing Materials (ASTM); D570, D624, D638, D746, D747 and D792.

1.4 SUBMITTALS

A. Submit warranty and testing support material from supplier stating that materials meet requirements of referenced Corps of Engineer Standards, ASTM and ACI Standards.

B. Submit a minimum of three prints of shop drawings. Only one marked up print will be returned. Detail placement and temporary support of waterstop in concrete formwork for wall and floor.

C. Shop drawings shall include the following note completed and signed by the Contractor:

THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS:

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Store waterstops under tarps to protect from oil, dirt, and sunlight.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide flexible PVC (polyvinyl chloride) waterstop as manufactured by Greenstreak or equal, profile style number as labeled on plans.

B. The PVC waterstop shall be extruded from an elastomeric plastic material of which the basic resin is prime virgin polyvinyl chloride. The PVC compound shall not contain any scrapped or reclaimed material or pigment whatsoever.

C.

Property	**Test Method**	**Required Limits**
Water absorption	ASTM D 570	0.15% max
Tear Resistance	ASTM D 624	300 lb/in (52.5 kN/m) min.
Ultimate Elongation	ASTM D 638	350% min.
Tensile Strength	ASTM D 638	2000 psi (13.78 Mpa) min.
Low Temperature Brittleness	ASTM D 746	No Failure @ -35° F (-37° C)
Stiffness in Flexure	ASTM D 747	700 psi (4.82 Mpa) min.
Specific Gravity	ASTM D 792	1.38 max.
Hardness, Shore A	ASTM D 2240	79 $\pm$3
Tensile Strength after accel-erated extraction	CRD-C 572	1600 psi (9.54 Mpa) min.
Elongation after accelerated extraction	CRD-C 572	300% min.
Effect of Alkalies after 7 days: Weight Change Hardness Change	CRD-C 572	 between -0.10% / +0.25% +/- 5 points

2.2 ACCESSORIES

A. Provide factory made waterstop fabrications for all changes of direction, intersections, and transitions leaving only straight butt joint splices for the field.

B. Provide hog rings or grommets spaced at 12 inches on center along length of waterstop.

C. Provide Teflon coated thermostatically controlled waterstop splicing irons for field butt splices.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Field butt splices shall be heat fused welded using a Teflon coated thermostatically controlled waterstop splicing iron at approximately 380 degrees

(F) Follow approved manufacturer recommendations. Lapping of waterstop, use of adhesives, or solvents shall not be allowed.

B. Center waterstop in joint and secure waterstop in correct position using hog rings or grommets spaced at 12 inches on center along the length of the waterstop and wire tie to adjacent reinforcing steel.

3.2 FIELD QUALITY CONTROL

A. Waterstop splicing defects which are unacceptable include, but are not limited to the following:
   1. Tensile strength less than 80 percent of parent section.
   2. Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch.
   3. Bond failure at joint deeper than 1/16 inch or 15 % of material thickness.
   4. Misalignment that reduces waterstop cross section more than 15 percent.
   5. Visible porosity in the weld.
   6. Bubbles or inadequate bonding.
   7. Signs of splice separation when cooled splice is bent at a sharp angle.
   8. Charred or burnt material.

END OF SECTION 03 20 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Sections:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

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

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Product Data for Credit IEQ 4.3: For curing and sealing compounds, documentation including printed statement of VOC content.
3. Design Mixtures for Credit ID 1.1: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.

C. Design Mixtures: For each concrete mixture.

D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material test reports.

D. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

1. Galvanized Reinforcing Bars: ASTM A 767/A 767M, zinc coated after fabrication and bending.
2. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

E. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from galvanized-steel wire into flat sheets.

F. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A coated, Type 1, plain steel.

G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I.

   a. Fly Ash: ASTM C 618, Class F or C.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

B. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class [A] [B] [C]. Include manufacturer's recommended adhesive or pressure-sensitive tape.

B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 15 mils thick.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: as indicated in the construction documents at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture.
4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-third of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

E. Waterstops: Install in construction joints and at other joints indicated according to manufacturer's written instructions.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color

of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

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

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces [indicated] [and] [to receive concrete floor toppings] [to receive mortar setting beds for bonded cementitious floor finishes] <Insert locations>.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 03 30 00

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units (CMUs).
   2. Face brick.
   3. Building (common) brick.
   4. Mortar and grout.
   5. Reinforcing steel.
   6. Masonry joint reinforcement.
   7. Ties and anchors.
   8. Embedded flashing.
   9. Miscellaneous masonry accessories.
   10. Cavity-wall insulation.

B. Related Sections include the following:
   1. Division 07 Section "Bituminous Dampproofing" for dampproofing applied to cavity face of backup wythes of cavity walls.
   2. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
   3. Division 07 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.

C. Products furnished, but not installed, under this Section include the following:
   1. Dovetail slots for masonry anchors, installed under Division 03 Section "Cast-in-Place Concrete."
   2. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 05 Section "Structural Steel Framing."

D. Products installed, but not furnished, under this Section include the following:
   1. Steel lintels and shelf angles for unit masonry, furnished under Division 05 Section "Metal Fabrications."
   2. Manufactured reglets in masonry joints for metal flashing, furnished under Division 07 Section "Sheet Metal Flashing and Trim."

1.3 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

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

B. Shop Drawings: For the following:
   1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
   2. Location of all construction and control joints.

C. Samples for Verification: For each type and color of the following:
   1. Face brick, in the form of straps of five or more bricks.
   2. Special brick shapes.
   3. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project**.** Label Samples to indicate types and amounts of pigments used.
   4. Weep holes/vents.
   5. Accessories embedded in masonry.

D. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
   1. Masonry units.
      a. Include material test reports substantiating compliance with requirements.
      b. For exposed brick, include material test report for efflorescence according to ASTM C 67.
   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
   4. Grout mixes. Include description of type and proportions of ingredients.
   5. Reinforcing bars.
   6. Joint reinforcement.
   7. Anchors, ties, and metal accessories.

E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
   2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

F. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup of section as shown on Mock-up Drawings.
   2. Build mockups Indicate portion of Work represented by mockup on drawings including face and backup wythes and accessories.
      a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.
      b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
      c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
   3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
   4. Protect accepted mockups from the elements with weather-resistant membrane.
   5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
   6. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.6 PRE-INSTALLATION MEETINGS

A. Conduct the conference at the job site on a date and time set a minimum of 2 weeks in advance of beginning work.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, Installer, system manufacturer's representative, adjacent materials Installers, and installers whose work interfaces with or affects the wall transition to the windows.
   2. Review location of all construction joints and control joints with the architect prior to beginning construction.

3. Review methods and procedures related to installation, including manufacturer's written instructions.
4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Examine substrate and surrounding conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of walls and windows during and after installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
   2. Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

F. Comply with applicable Building Code requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
   2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.3 CONCRETE MASONRY UNITS (CMUs)

A. Shapes: Provide shapes indicated and as follows:
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide bullnose units for all exposed outside corners, unless otherwise indicated.
   3. Provide square-edged units for concealed outside corners, unless otherwise indicated.

B. Concrete Masonry Units: ASTM C 90.
   1. Weight Classification: Lightweight.

2. Compressive Strength: Provide units with minimum average net-area compressive strength at 28 days of:
   a. Non-loadbearing: 1500 psi
   b. Loadbearing: 1900 psi
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.4 MASONRY LINTELS

A. Masonry Lintels: built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.

2.5 BRICK

A. General: Provide shapes indicated and as follows:
   1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
   2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
   3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
   4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Patterning: Refer to drawings for location, size and pattern types.

C. Face Brick: ASTM C 216, Grade SW, Type FBS Smooth.
   1. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
   2. Modular Size (Nominal Dimensions): nominal 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
   3. Application: Use where brick is exposed, unless otherwise indicated.
   4. Products:
      a. Brick Color No. 1: General Shale: UAB Blend

D. Closure Face Brick: ASTM C 216, Grade SW, Type FBS Smooth.
   1. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
   2. Closure Size (Nominal Dimensions): nominal 3-5/8 inches wide by 3 5/8 inches high by 7-5/8 inches long.
   3. Application: Use where brick is exposed, unless otherwise indicated.
   4. Products:
      a. Brick Color No. 1: General Shale: Greystone Velour

E. Decorative Face Brick: ASTM C 216, Grade SW, Type FBS Smooth.
   1. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.

2. Utility Size (Nominal Dimensions): nominal 3-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long.
3. Application: Use where shown in the drawings.
4. Products:
   a. Brick Color No. 2: General Shale: Greystone Velour
   b. Brick Color No.3: General Shale: Greystone Rockface

F. Decorative Face Brick: ASTM C 216, Grade SW, Type FBS Smooth.
1. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
2. Size (Nominal Dimensions): Manufacturer's standard bullnose.
3. Application: Use where shown in the drawings.
4. Products:
   a. Brick Color No. 1: General Shale: Greystone Velour

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type N and S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
1. Available Products:
   a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
   b. Davis Colors; True Tone Mortar Colors.
   c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

E. Colored Cement Product: Packaged blend made from portland cement and lime or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
2. Pigments shall not exceed 10 percent of portland cement by weight.
3. Available Products:
   a. Colored Portland Cement-Lime Mix:
      1) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
      2) Lafarge North America Inc.; Eaglebond.
      3) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
   b. Colored Masonry Cement:

1) Capital Materials Corporation; Flamingo Color Masonry Cement.
2) Essroc, Italcementi Group; Brixment-in-Color.
3) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
4) Lafarge North America Inc.;.
5) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
6) National Cement Company, Inc.; Coosa Masonry Cement.

F. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

G. Aggregate for Grout: ASTM C 404.

H. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951.
1. Interior Walls: Mill- galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods and Cross Rods: reference structural drawings for minimum sizes.
4. Wire Size for Veneer Ties: W2.8 or 0.188-inch diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry,
1. At unreinforced masonry :truss type with single pair of side rods. Reference structural drawings for minimum sizes.
2. At 8 and 12 inch reinforced masonry units: ladur type. Reference structural drawings for minimum sizes.

D. Masonry Joint Reinforcement for Multiwythe Masonry (CMU Cavity Walls): ladder type with 3/16 inch double pintle ties. Reference structural drawings for minimum side rod and cross rod wire sizes.

2.8 MASONRY TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641, Class 1 coating.

2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
3. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.
4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

C. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.
2. Tie Section for Steel Frame: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch- diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.
3. Tie Section for Concrete: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch- diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls, unless otherwise indicated.

D. Seismic Adjustable Anchors for Cavity Walls (Metal Stud backup): hot-dip galvanized, 12 gage plate with 3/16 inch diameter hot-dip galvanized triangular ties, with seismic clip and minimum 9 gage continuous wire reinforcing wire .
1. Hohmann Barnard: HB-213 S.I.S. with welded seismic clip and minimum 9 gage continuous wire.
2. Wirebond: RJ711 (2401-2402) with welded seismic clip and minimum 9 gage continuous wire.
3. Dur-O-Wal: DA213 clip and DA-213QT pintle ties with welded seismic clip and minimum 9 gage continuous wire.

E. Adjustable Anchors for Cavity Walls (Metal Stud backup): hot-dip galvanized 14 gage plate with 3/16 inch diameter hot-dip galvanized triangular ties.
1. Hohmann Barnard: DW-10HS with triangular ties.
2. Dur-O-Wal: DA-210 with DA 700 series triangular ties.
3. Heckman: 315D with 316 ties.
4. Hohmann Barnard: HB-213

2.9 MISCELLANEOUS ANCHORS

A. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch, galvanized steel sheet.

B. Anchor Bolts: Headed steel bolts complying with ASTM A 325; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

C. Panel anchors: provide stainless steel anchors and compatible fasteners for attachment of panels. Include anchor detailing in shop drawing submittal.

2.10 CONCEALED FLASHING MATERIALS

A. Flexible Flashing (cavity wall flashing not exposed to the exterior): composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. York: York 304 Self Adhering Stainless Steel
      b. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
      c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing..

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

C. Termination bars required for flexible flashing: stainless steelminimum 1 inch wide, with sealant ledge.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

A. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

B. Weep/Vent Products: cell vent, color to be selected from manufacturer's full range of colors. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   1. Hohmann & Barnard, Inc.; #QV - Quadro-Vent.
   2. Dur-O-Wal; DA 106 cell vent.
   3. Heckman Building Products Inc.; No 85 cell vent.

C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
   1. Provide one of the following configurations:
      a. Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.
      b. Strips, not less than 1-1/2 inches thick (fill the depth of the cavity) and 10 inches wide, with dimpled surface designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
   2. Available Products:
      a. Advanced Building Products Inc.; Mortar Break II.

b. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarNet.
c. Mortar Net USA, Ltd.; Mortar Net.

D. Combination flashing, mortar net, termination bar and weeps:.Mortar Net TotalFlash Cavity Wall system may be used in lieu of individual components listed above.

E. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
1. Available Products:
a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.12 CAVITY WALL INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV or Type X, nominal 1-1/2 inch thick, closed-cell product extruded with an integral skin.

B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.13 MASONRY CLEANERS

A. Proprietary Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned. Clean one-half of mockup panel to verify proposed material is suitable for use on brick types provided on this project. Architect will review cleaned mockup panel prior to use of proposed material on the building.
1. Available Manufacturers:
a. ProSoCo, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
1. Verify that foundations are within tolerances specified.
2. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

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

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
   1. Mix units from several pallets or cubes as they are placed.

F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

G. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
   1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
   2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
   3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
   4. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type

joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

G. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

H. Build non-load-bearing interior partitions full height of story to underside of roof structure above, unless otherwise indicated.
   1. Brace partition top to structure as indicated on the drawings.
   2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 CAVITY WALLS

A. Bond wythes of cavity walls together using specified reinforcing.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
   1. Space reinforcement not more than 16 inches o.c.
   2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
      a. Reinforcement above is in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
   1. Provide an open space not less than 1/2 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
   2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
   3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Insert slip-in anchors in metal studs as sheathing is installed. Provide one anchor at each stud in each horizontal joint between sheathing boards.
2. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of insulation.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally with not less than 1 anchor for each 1.78 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.9 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. All expansion joints and control joints will shall be installed per industry standard as outlined by the Brick Institute of America and the National Concrete Masonry Association.

C. Form control joints in concrete masonry using preformed control-joint gaskets designed to fit standard sash block.

D. Form expansion joints in brick by forming an open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

E. Install Expansion Joint Assemblies as detailed on the drawings.

3.10 LINTELS

A. Install steel lintels where indicated.

B. Provide lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows, unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar.

Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of backup wall at least 8 inches.
3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
4. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep products to form weep holes.
2. Space weep holes 24 inches o.c., unless otherwise indicated.

E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

3.12 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ ASCE 6/ TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.13 FIELD QUALITY CONTROL

A. Inspectors: Contractor will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

3.14 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   5. Clean masonry with an approved proprietary cleaner applied according to manufacturer's written instructions.

3.15 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 04 42 00 – EXTERIOR STONE CLADDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes furnishing and installing all selected Manufactured materials and Products, including but not limited to:
   1. Limestone dimension stone cladding.

B. Related Sections include the following:
   1. Division 03 " Cast in place Concrete"
   2. Division 04 " Unit Masonry"
   3. Division 07 " Thermal Insulation: insulation for Cavity Spaces
   4. Division 07 " Air and Moisture Barriers"
   5. Division 07 " Sheet Metal Flashing and Trim"
   6. Division 07 " Joint Sealants"

1.3 DESIGN REQUIREMENTS

A. General: Design, fabricate and install stone cladding to withstand normal loads from wind, gravity, movement of building structure, and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather, without failure.

B. Retain the services of a cladding engineer, as described below, to design the cladding support and retention system. Cladding engineer will prepare engineering calculations for the justification of all principal stonework, units, fasteners, and anchorage components for compliance with the performance criteria established herein.

C. Engineering Calculations: base calculations on design loads, material properties, and applicable safety factors. Include the following information as part of the calculations:
   1. Stone loads and allowable loads,
   2. Stone thicknesses,
   3. Support and anchorage loads, stresses, safety factors, design loads, and allowable loads,
   4. Support and anchorage sizes.

D. Design connections and attachments for limestone to carry the design loads with safety factors and allowable stresses in accordance with the American Institute of Steel Construction (AISC), except that steel supports carrying gravity loads shall be stressed not more than 50 percent of the yield stress in bending.

E. Design, detail and fabricate connections to provide allowance for fabrication tolerances, erection tolerances and structural deflections. Refer to ASTM C1242.

F. Control of Corrosion: Prevent galvanic and other forms of corrosion by insulating metals and other materials from direct contact with non-compatible materials, or by suitable coating.

1.4 SUBMITTALS

A. Product Datacenter
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sound barrier wall end cap system

B. Shop Drawings
   1. Include typical dimensioned cross-section(s) at the location where drywall partition terminates at the perimeter curtain wall, indicating
      a. Dimensions as shown on the drawings.
      b. Finish as shown on the drawings.
      c. Samples: For each exposed product and for each color and texture specified.
         1) Size: 12 inches
   2. Provide Qualification of Installers

C. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.5 QUALITY ASSURANCE

A. Fabricator: Company having sufficient capacity to quarry, cut, and deliver the stonework on schedule.

B. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

C. Mockups: Build mockups Indicate portion of Work represented by mockup on Drawings or draw mockup as separate element.
   1. Build mockup of section as shown on Mock-up Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Testing: conduct tests on dimension stone for compressive strength and modulus of rupture.

1.6 PRE-INSTALLATION MEETINGS

A. Conduct the conference at the job site on a date and time set a minimum of 2 weeks in advance of beginning work.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, Installer, system manufacturer's representative, adjacent materials Installers, and installers whose work interfaces with or affects the wall transition to the windows.
   2. Review methods and procedures related to installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine substrate and surrounding conditions and finishes for compliance with requirements, including flatness and fastening.
   5. Review structural loading limitations of walls and windows during and after installation.

B. Review governing regulations and requirements for insurance and certificates if applicable.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store stone in a manner designed to prevent damage and staining of units. Prevent damage to units.

B. Lift skids with proper and sufficiently long slings or forks with protection to prevent damage to units. Protect edges and corners.

C. Stack units on timbers or platforms at least 3" above grade.

D. Place polyethylene or other non-staining plastic film between wood and other finished surfaces of units when stored for extended periods of time.

E. Cover stored units with non-staining, weather-proof protective enclosure if exposed to weather.

F. Do not use salt or calcium-chloride to remove ice from stone surfaces.

1.8 PROJECT CONDITIONS

A. Conform to requirements of ACI 530.1/ASCE 6/TMS 602. Specifications for Masonry Structures, PART 1.8.

1.9 WARRANTY

A. Provide manufacturer’s Full Lifetime Warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers, basis of design: Product specifications are based upon the first named manufacturer. 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 of dolomitic limestone having Product considered acceptable for use: Arriscraft International Inc. Renaissance Series.

C. Substitutions will only be permitted if the procedures are followed in Division 01.

2.2 MATERIALS

A. Dolomitic Limestone: to ASTM C568, Category III - High Density; special shapes as indicated; having the following typical average properties when tested to the identified standard:
   1. Compressive Strength: 8,500 psi, 45.4 MPa to ASTM C170.
   2. Absorption: 8.8 percent, to ASTM C97.
   3. Density: 129 lbs/ft3, to ASTM C97.
   4. Modulus of Rupture: 770 psi, to ASTM C99.
   5. Flexural Strength: 1,600 psi to ASTM C880.
   6. Abrasion Resistance: 18.0 to ASTM C241.

2.3 FABRICATED UNITS

A. Stone Panels: dolomitic limestone panels, as described below:
   1. Bed Thickness: 2-1/8" thick;
   2. Panel Sizes: modular sizes as indicated on Drawings;
   3. Finish: rocked andfine-dressedfinish on exposed faces and ends as required;
   4. Color Renaissance, Montecito
   5. Pattern: refer to exterior elevations and details for patterning.

B. Sills and Trim: dolomitic limestone units, sizes and profiles as indicated on Drawings.

2.3 ACCESSORY MATERIALS

A. Anchors, Cramps, Dowels: to ASTM C1242, stainless steel, Type 304.

B. Bed Reinforcement: as specified in Division 04 “Unit Masonry”.

C. Setting Buttons: resilient plastic type; non-staining; sized to suit joint thicknesses and bed depths without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting button.

D. Seismic Clips: purpose made clips designed to secure bed joint reinforcement to the structural substrate’s joint reinforcement system as a composite element

and allow in-plane vertical and horizontal movement while restraining lateral movement; as required and described in the structural specifications.

E. Through-Wall Flashing: as specified in Division 07 “Sheet Metal Flashing and Trim”.

F. Mortar: as specified in Division 04 “Unit Masonry”.

G. Grout: as specified in Division 04 “Unit Masonry”.

H. Weep Vents: as specified in Division 04 “Unit Masonry”.

I. Sealant and Backer Rod: as specified in Division 07 “Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Review existing site conditions and verify that all substrate materials are acceptable for attachment.

B. Review and examine all materials to be installed and verify that they are not cracked or broken prior to installation.

3.2 PREPARATION

A. Protect surrounding and adjacent work as required preventing damage to preceding work during execution of this work.

B. Perform all preparation necessary for a successful installation of products as specified in manufacturer’s installation instructions.

3.3 INSTALLATION

A. Obtain Manufacturer’s instructions for successful installation of work to be performed and become knowledgeable with all material handling and installation recommendations.

B. Ensure full compliance with Manufacturer’s instructions in all aspects of tasks required by this work. Install products in accordance with manufacturer’s instructions at locations indicated on the drawings.

C. Coordinate all work with other project trades to assure proper installation and provide proper accommodations for following work by other trades.

3.4 FABRICATION

A. Cut stone to shape and dimensions and full to square with joints as indicated.

B. Dress exposed faces true.

C. Cut-in reglets for flashings where indicated.

D. Execute profiled work from full size details and templates

E. Make exposed arrises in true alignment and ease slightly to prevent snipping.

F. Back-check stone contacting structural members as indicated. Allow minimum 1" clearance between back of stone and steel and concrete structural members. Shape beds of stone resting on structural work to fit supports.

G. Cut stones for anchors, cramps, dowels and support systems. Provide lewis pin and clamp holes in pieces which cannot be manually lifted. Do not cut holes in exposed surfaces.

H. Finish exposed faces and edges of stones to comply with requirements indicated for finish and to match approved samples and field-constructed mock-up.

3.5 SETTING STONE

A. Set stones plumb, true, and level, to requirements indicated on drawings and approved shop drawings.

B. Align stone edges and faces according to established relationships and indicated tolerances.

C. Provide movement joints of widths and at locations indicated on drawings. Do not fill movement joints with mortar.

D. Set stones in full bed of mortar with vertical joints buttered and placed full, except where otherwise specified. Completely fill anchor, dowel and lifting holes.

E. Lay stone panel cladding to patterns indicated on Drawings. Install anchors, dowels and cramps. Shim and adjust supports to set stones accurately in locations indicated with uniform joints of widths indicated.

F. Make joints 3/8" thick.

G. Embed only ends of lugged sills and steps in mortar. Leave balance of joint open for final pointing.

H. Place [setting buttons] [soft-wood wedges] under stones to maintain joint thickness. Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.

I. Brace and anchor projecting stones until wall above is set.

J. Use soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry and without breaking them off, fill voids with pointing mortar.

K. Install through-wall flashing membranes at continuous shelf angles, steel lintels, ledges and similar obstructions to the downward flow of water.

L. Install weep vents at 24" min OC horizontally above through-wall flashing, above shelf angles, and at bottom of walls.

M. Tool joints after initial set has occurred.

3.6 FIELD QUALITY CONTROL

A. Tolerances:
1. Except where dimension is formed by a split or rocked finish, fabricate limestone dimension stone to the following tolerances:
a) Unit Length: plus or minus 1/8".
b) Unit Height: plus or minus 1/8".
c) Deviation From Square: plus or minus 1/8", with measurement taken using the longest edge as the base.
d) Bed Depth: plus or minus 1/8".

2. Inspect installed dimension stone and reject stone that is chipped, cracked, or blemished (streaked, stained or otherwise damaged), as described below.
1. Stone will be inspected to be free of spalls, cracks, open seams, pits or other defects that are likely to impair its structural integrity in its intended use.
2. Units shall exhibit a texture approximately equal to the approved sample when viewed under diffused daylight illumination at a 20 foot distance.
3. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under diffused daylight illumination from a 20 foot distance.
4. Dry seams will not be cause for rejection.

B. After installation, check all work for flaws and defects.

C. Repair all defective work.

D. Remove and replace all damaged components that cannot be successfully repaired as determined by Project Architect

3.7 PROTECTION

A. Protect surfaces from damage until Date of Substantial Completion. Repair or replace damaged components that cannot be repaired to architect’s satisfaction.

B. Fabricator/Installer to provide a Maintenance kit and shall review maintenance procedures and the product warranty with the Owner's maintenance personnel upon completion of project.

3.8 CLEANING

A. Remove all protection materials.

B. Clean all surfaces following manufacturer's recommendations prior to final project completion. Do not use harsh cleaning materials or methods that would damage finish.

C. Dispose properly of all debris generated by this work, protection materials and cleaning materials.

D. Post-Construction: Clean one-half of mock-up panel as directed below and leave for one week. If no harmful effects appear and after mortar and sealant has set and cured, clean masonry as follows:

1. Protect windows, sills, doors, trim and other work from damage.
2. Remove large particles with stiff fiber brushes] without damaging surface.
3. Saturate stone with clean water and flush off loose mortar and dirt.
4. Dilute cleaning agent with clean water in controlled proportions.
5. Apply solution to pre-soaked wall surface using soft-bristled brush or low pressure acid-resistant sprayer.
6. Thoroughly rinse cleaning solution and residue from wall surface.

END OF SECTION 04 42 00

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Related Requirements:

1. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Laboratory Test Reports for Credit IEQ 4.2: For primers, documentation indicating that products comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

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

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator, and testing agency.

B. Welding certificates.

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

D. Source quality-control reports.

E. Field quality-control and special inspection reports.

1.5 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.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

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

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

1. AISC 303.
2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear 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. Select and complete connections using schematic details indicated and AISC 360.
2. Use Load and Resistance Factor Design or Allowable Stress Design.

B. Moment Connections: Type FR, fully restrained.

C. Construction: Combined system of moment frame and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

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

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

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

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

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

G. Welding Electrodes: Comply with AWS requirements.

2.3 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.

1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type with plain finish.

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

1. Finish: Plain.

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

E. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: Straight.
2. Finish: Plain.

F. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.

1. Finish: Plain.

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

1. Finish: Plain.

H. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

2.4 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

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

2.5 GROUT

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

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

B. 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.

2.7 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: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.8 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.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Surfaces enclosed in interior construction.

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."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast 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. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

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

B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections 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 are not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 ERECTION

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

B. Baseplates Bearing Plates 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. Pretension 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 303, "Code of Standard Practice for Steel Buildings and Bridges."

3.3 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.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.

3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections:

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test and inspect field welds 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 are not accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. K-series steel joist substitutes.
3. LH- and DLH-series long-span steel joists.
4. Joist girders.
5. Joist accessories.

1.2 ACTION SUBMITTALS

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

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Laboratory Test Reports for Credit EQ 4: For primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Manufacturer certificates.

C. Mill Certificates: For each type of bolt.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.

2.2 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

2.3 LONG-SPAN STEEL JOISTS

A. Manufacture steel joists according to "Standard Specification for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as indicated.

2.4 JOIST GIRDERS

A. Manufacture joist girders according to "Standard Specification for Joist Girders" in SJI's "Specifications," with steel-angle top- and bottom-chord members; with end and top-chord arrangements as indicated.

2.5 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

B. Primer: Provide shop primer that complies with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

2.6 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.

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

1. Finish: Plain.

D. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.7 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

B. Apply one coat of shop primer to joists and joist accessories.

C. Shop priming of joists and joist accessories is specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting.".

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

C. Field weld joists to supporting steel, bearing plates, and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.
2. Noncomposite form deck.

1.2 ACTION SUBMITTALS

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

A. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Laboratory Test Reports for Credit EQ 4: For primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Evaluation reports.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. 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."

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 ROOF DECK

1. ASC Profiles, Inc.; a Blue Scope Steel company.
2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Epic Metals Corporation.
8. Marlyn Steel Decks, Inc.
9. New Millennium Building Systems, LLC.
10. Nucor Corp.; Vulcraft Group.
11. Roof Deck, Inc.
12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
13. Verco Manufacturing Co.
14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. 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: Gray.

2. Deck Profile: As indicated.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.

2.3 NONCOMPOSITE FORM DECK

1. ASC Profiles, Inc.; a Blue Scope Steel company.
2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Epic Metals Corporation.
8. Marlyn Steel Decks, Inc.
9. New Millennium Building Systems, LLC.
10. Nucor Corp.; Vulcraft Group.
11. Roof Deck, Inc.
12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
13. Verco Manufacturing Co.
14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Noncomposite 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. 31, with the minimum section properties indicated, and with the following:

1. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 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: Gray.
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: Gray.

4. Profile Depth: As indicated.
5. Design Uncoated-Steel Thickness: As indicated.

2.4 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 pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 12 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. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

G. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

C. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

D. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

E. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

F. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

G. 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.

H. 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.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

I. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.

J. 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.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Prepare test and inspection reports.

3.3 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M 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.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Research reports.

1.4 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

C. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. AllSteel & Gypsum Products, Inc.
2. California Expanded Metal Products Company.
3. ClarkWestern Building Systems, Inc.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Craco Mfg., Inc.
6. Custom Stud Inc.
7. Design Shapes in Steel.
8. Dietrich Metal Framing; a Worthington Industries company.
9. Formetal Co. Inc. (The).
10. MarinoWARE.
11. MBA Building Supplies, Inc.
12. Nuconsteel; a Nucor Company.
13. Olmar Supply, Inc.
14. Quail Run Building Materials, Inc.
15. SCAFCO Corporation.
16. Southeastern Stud & Components, Inc.
17. State Building Products, Inc.
18. Steel Construction Systems.
19. Steel Network, Inc. (The).
20. Steel Structural Systems.
21. Steeler, Inc.
22. Super Stud Building Products, Inc.
23. Telling Industries, LLC.
24. United Metal Products, Inc.
25. United Steel Manufacturing.

2.2 PERFORMANCE REQUIREMENTS

A. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G60.

C. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G60.

2.4 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428.
2. Minimum Flange Width: 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and matching minimum base-metal thickness of steel studs.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 .
2. Flange Width: 1-5/8 inches.

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428.
2. Flange Width: 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.

C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

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

a. AllSteel & Gypsum Products, Inc.
b. ClarkWestern Building Systems, Inc.
c. Dietrich Metal Framing; a Worthington Industries company.
d. MarinoWARE.
e. SCAFCO Corporation.
f. Steel Network, Inc. (The).
g. Steeler, Inc.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration.

2.7 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.8 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

D. Install framing members in one-piece lengths.

E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

G. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing:As shown on Shop Drawings.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inc between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: 16 inches, unless noted otherwise.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically 48 inches, maximum. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to[top and] bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: [16 inches, unless noted otherwise.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to bypassing and infill studs and anchor to building structure.
4. Connect drift clips to cold-formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

   a. Install solid blocking at 96-inch.

2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, which ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 054400 - COLD-FORMED METAL TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-formed steel trusses for roofs.
2. Cold-formed steel trusses for floors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel trusses; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

D. Delegated-Design Submittal: For cold-formed steel trusses.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Aegis Metal Framing.
2. Genesis Worldwide Inc.
3. Marino/WARE.
4. Nuconsteel, A Nucor Company.
5. Steel Construction Systems.
6. TrusSteel; an ITW company.
7. USA Frametek.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel trusses capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated.
2. Deflection Limits: Design trusses to withstand design loads without deflections greater than the following:

   a. Floor Trusses: Vertical deflection of 1/480 for live loads and l/360 for total loads of the span.
   b. Roof Trusses: Vertical deflection of [1/240] [1/360] of the span.
   c. Scissor Roof Trusses: Horizontal deflection of 1-1/4 inches at reactions.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

C. Cold-Formed Steel Framing Design Standards:

1. Floor and Roof Systems: Design according to AISI S210.
2. Lateral Design: Design according to AISI S213.
3. Roof Trusses: Design according to AISI S214.

D. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 COLD-FORMED STEEL TRUSS MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Sheet: ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G60 .

2.4 ROOF TRUSSES

A. Roof Truss Members: Manufacturer's standard steel sections.

1. Connecting Flange Width: 1-5/8 inches, minimum at top and bottom chords connecting to sheathing or other directly fastened construction.
2. Minimum Base-Metal Thickness: 0.0428 inch.

2.5 ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of same grade and coating weight used for truss members.

B. Provide accessories of manufacturer's standard thickness and configuration unless otherwise indicated.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36], threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and Appendix D in

ACI 318, greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

B. Shims: Load bearing, of high-density multimonomer plastic, nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

2.8 FABRICATION

A. Fabricate cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate trusses using jigs or templates.
2. Cut truss members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel truss members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator.

a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

4. Fasten other materials to cold-formed steel trusses by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift fabricated trusses to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed steel trusses without reducing thickness of fire-resistive materials below that is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.2 INSTALLATION

A. Install, bridge, and brace cold-formed steel trusses according to AISI S200, AISI S214, AISI's "Code of Standard Practice for Cold-Formed Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.

B. Install cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened.

1. Fasten cold-formed steel trusses by welding or mechanical fasteners.

a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings; comply with requirements for spacing, edge distances, and screw penetration.

C. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

D. Truss Spacing: As indicated.

E. Do not alter, cut, or remove framing members or connections of trusses.

F. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

G. Erect trusses without damaging framing members or connections.

H. Coordinate with wall framing to align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

I. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings and designed according to CFSEI's TechNote 551e, "Design Guide: Permanent Bracing of Cold-Formed Steel Trusses.".

J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual trusses no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform inspections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Field and shop welds will be subject to testing and inspecting.

D. Prepare test and inspection reports.

3.4 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal trusses are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 44 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Metal ladders, elevator pit and roof access.
   2. Metal bollards.
   3. Loose steel lintels.
   4. Access Gates

B. Products furnished, but not installed, under this Section include the following:
   1. Loose steel lintels.

C. Related Sections include the following:
   1. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
   2. Division 05 Section "Structural Steel Framing."
   3. Division 05 Section "Steel Stairs."

1.3 SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for metal fabrications.
   1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
   2. Provide templates for anchors and bolts specified for installation under other Sections.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."
   2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,

concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A36.

B. Steel Tubing: ASTM A500, cold-formed steel tubing.

C. Steel Pipe: ASTM A53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide zinc-plated fasteners with coating complying with ASTM B633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F1554, Grade 36.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

D. Lag Bolts: ASME B18.2.1.

E. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488, conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
   1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
   1. Furnish inserts if units are installed after concrete is placed.

2.8 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls. Paint exposed portions of lintels.

2.9 METAL LADDERS

A. General:
   1. Comply with ANSI A14.3, unless otherwise indicated.
   2. For elevator pit ladders, comply with ASME A17.1.
   3. Space side rails 24 inches apart, unless otherwise indicated.
   4. Support each ladder with welded or bolted brackets, made from same metal as ladder at top and bottom and not more than 48 inches o.c.unless otherwise indicated on the drawings.

B. Steel Ladders:
   1. Side rails: reference drawings
      a. Interior ladders: continuous, 1/4-by 3-inch steel flat bars, with eased edges.

b. Exterior Roof ladders (if required): C3 x 5 channels.

2. Rungs: 1-inch- diameter deformed steel bars (#8 reinforcing rod).
3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
4. Provide personnel safety cage as required by OSHA 1910.27
5. Provide expanded metal lockable security panel the width of the ladder and 5' high mounted at 15' AFF.
6. Galvanize exterior ladders, including brackets and fasteners.
7. Prime interior ladders, including brackets and fasteners, with zinc-rich primer.

2.10 METAL BOLLARDS

A. Metal bollards: Schedule 40 steel pipe, 6 inch diameter, unless indicated otherwise on the drawings.

1. Fill bollards with concrete and provide a convex cap at top to shed water. Provide at locations where protection from vehicles are required.
2. Cap removable bollards with 1/4-inch- thick steel plate.
3. Size bollards to provide minimum 3 foot embedment with 4 foot exposed above grade.

B. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 3/4 inch steel machine bolt.

2.11 ACCESS FLAP GATES

C. Heavy Duty

3. Type MHF-2 gates shall have gray cast iron frames and flaps and shall be fitted with stainless steel seat facings, gray cast iron or stainless steel hinge arms, and stainless steel bushings, hinge pins, and fasteners.

Materials	ASTM Specifications
Cast iron and Gray cast iron	A 48, Class 30, or A 126, Class B
Cast Steel	A 27 or A 148
Structural steel shapes, plates, and bars	A 36
Carbon steel bars	A 108 or A 575
Stainless steel	A 167, A 276 or A 582 Type 302, 303, 304, or 304L
Austenitic gray cast iron	A 436
Castings, nickel and nickel-alloy	A 494
Carbon steel sheets & strips	A 569
Bronze bar, rods, shapes and Naval bronze	B 21 or B 98

Red Brass	B 43
Silicon bronze	B 98 or B 584
Phosphor bronze	B 103 or B 139
Manganese bronze	B 138 or B 584
Nickel-copper alloy plate, sheet, strip	B 127
Nickel-copper alloy rod, bar	B 164
Cast bronze	B 584
Rubber gaskets and seals	D 2000

D. Frame: The frame shall be cast iron or cast steel for light and moderate duty gates and as specified for heavy-duty gates, and of the specified type. For moderate and heavy-duty gates, the rear face shall be machined as required to match the specified attaching means. For the heavy-duty gate, a groove shall be matched on the perimeter of the front face to receive the seat facing

F. For heavy-duty gates, the flap shall be built to withstand the seating head expressed by the gate class designation, as defined in Section 2 of this specification. A groove shall be machined on the perimeter of the face to receive the seat facing.

G. Linkage System: The linkage system by which the flap is mounted onto the frame shall be double-pivoted type for gates over eight (8) inches in diameter. It shall be designed to prevent the flap form folding inside of the seat and wedging in the open position. For the moderate heavy-duty gates, the top pivot shall be so designed as to allow adjustment of gate alignment and sensitivity.

H. Wall Thimble: For moderate and heavy-duty gates when a wall thimble is specified, it shall be of the same cast iron used in the gate frame and of the section, type, and depth specified. The front flange shall be machined to match the gate frame and drilled and tapped to accurately receive the gate attachment studs. Gaskets or mastic to be installed between the thimble and the gate frame shall conform to the recommendations of the gate manufacturer and shall be furnished with the thimble.

I. Heavy Duty Gates - Metal facings shall be pressed or impacted into machined dove-tailed grooves on the flap and frame (or securely attached in the seat grooves by means of studs, set screws or other approved means) and machined to a smooth finish to insure proper contact. Rubber facings shall be pressed into a dove-tailed groove in the frame.

2.12 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.13 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
   1. ASTM A123, for galvanizing steel and iron products.
   2. ASTM A153, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
   1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Anchor internal sleeves for removable bollards in concrete by inserting into pipe sleeves preset into concrete. Fill annular space around internal sleeves solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward internal sleeve.

C. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner will furnish padlocks.

D. Fill bollards solidly with concrete, mounding top surface to shed water.
   1. Do not fill removable bollards with concrete.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION 05 50 00

SECTION 05 51 00 - STEEL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Steel Stair Assemblies.
   2. Steel Handrails.
   3. Landing and Guardrails.
   4. Wall Mounted Handrails and Brackets.

B. Related Sections include the following:
   1. Division 03 Section "Cast-in-Place Concrete", concrete fill in stair and landing pans.
   2. Division 05 Section "Metal Fabrications", steel ladders.
   3. Division 09 Section "Painting", field paint finish.

1.3 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Furnish setting drawings and templates for installation of anchor bolts and other anchorage to be installed by others.

1.4 DESIGN REQUIREMENTS

A. Design and construct stairs to carry the most stringent of a live load of 100 pounds per square foot or a concentrated live load of not less than 2,000 pounds placed upon any space two and one-half feet square or a concentrated live load of 300 pounds placed on an area of 4 square inches in the center of the tread.

B. Design and construct handrails to withstand the most stringent of a live load of not less than 200 pounds applied at any point, in any direction or a live load of 50 pounds per foot applied in any direction.

C. Design and construct guardrails to withstand loads transmitted by attached handrails or a horizontal live load of 50 pounds per linear foot applied at the top of the guardrail with a simultaneous downward live load of 100 pounds per foot, or a concentrated live load of 200 pounds applied at any point and any direction at the top of the guardrail, whichever condition produces maximum stresses.

D. Design and construct intermediate rails and panels to withstand a concentrated live load of 200 pounds over a 1 foot square area of the guardrail system including any open areas. In determining stress on guardrail members, this load need not

be assumed to be acting concurrently with uniform horizontal loads on top rails of guardrails.

1.5 REFERENCES

A. Steel Structures Painting Council (SSPC) "Steel Structures Painting Manual," Fourth Edition, 1985, is used as a reference standard for bituminous coating, surface preparation, and shop paint application.

1.6 QUALITY ASSURANCE

A. Comply with National Association of Architectural Metal Manufacturers (NAAMM) "Metal Stairs Manual," Fifth Edition, 1992, as minimum standard for construction, proportions, and dimensions.

B. Comply with American Welding Society (AWS) D1.1-96, "Structural Welding Code" for welding materials and processes, and for qualification of welding operators.

1.7 SUBMITTALS

A. Submit product data for the following:
   1. Wall mounted handrail brackets.
   2. Shop drawings for fabrication and erection of stair assemblies, handrails, and guards.
   3. Indicate profiles, sizes, connection attachments, reinforcing, anchoring, openings, size and type of fasteners, and accessories.
   4. Include erection elevations and details where applicable.
   5. Indicate welded connections using standard AWS welding symbols.

B. Submit one reproducible sepia and one print of shop drawings. Only marked up sepia will be returned. Prepare shop drawings under seal of a Professional Structural Engineer registered in the State of Tennessee.

C. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For each product, one of the listed manufacturers:
   1. Shop Paint:
      a. Pittsburgh Paints, PPG Industries, Inc.
      b. Sherwin Williams
      c. Glidden / ICI Paints.
   2. Wall Rail Accessories:

a. J.G. Braun Company
b. Julius Blum and Company

2.2 MATERIALS

A. Structural Shapes and Plates: ASTM A36-96.

B. Steel Pipe: ASTM A53-96, Grade B, Schedule 40, unless indicated otherwise.

C. Miscellaneous Bar Shapes: ASTM A29-93a.

D. Sheet and Strip:
1. Hot-Rolled: ASTM A569-91a(1993)e1.
2. Cold-Rolled: ASTM A366-91(1993)e1.

E. Bolts: ASTM A307-94, Grade A.

F. Welding Materials: AWS D1.1-96, type required for materials being welded.

G. Shop Paint: Pittsburgh Paint G-9412 or equivalent by other acceptable manufacturer.

H. Bituminous Coating: SSPC Paint 12.

I. Wall Rail Accessories: Provide the following, or equivalent by other acceptable manufacturer.
1. Brackets: provide 2-1/4 inch clearance to wall and 1-1/2 inch vertical clearance from bottom of handrail to bracket.
a. steel handrail bracket for 1-1/2 inch OD dia pipe rail: JG Braun, 1930F.
2. steel handrail bracket for 1-1/2 inch OD dia pipe rail Julius Blum No. 621. Plug: Julius Blum No. 608.

2.3 FABRICATION

A. Construct stairs to conform to sizes and arrangements shown.

B. Size and structural members and connection to adequately support specified design loads.

C. Fabricate wall stringers to form base 2 inches high. Close exposed ends of stringers.

D. Form risers of cold-rolled steel or hot-rolled steel, at fabricator's option.

E. Form landing platforms of steel floor plate, with nosing to match treads.

F. Fabricate rails and guards of steel pipe, nominal (IPS) size as indicated.

G. Fabricate items with joints tightly fitted and secured. Weld joints unless otherwise indicated. Grind exposed welds flush and smooth with adjacent finished surfaces.

2.4 FINISH

A. Prior to cleaning, remove heavy deposits of oil and grease in accordance with SSPC SP-1 Solvent Cleaning.

B. Prior to painting, clean surfaces of rust, scale, and foreign matter, in accordance with SSPC SP-3 Power Tool Cleaning.

C. Paint in accordance with SSPC PA-1 Shop, Field, and Maintenance Painting.

D. Apply at rate to obtain 1.5 mil dry film thickness.

E. Do not paint surfaces in direct contact with concrete or where welding is required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify alignment with adjacent construction.

3.2 PREPARATION

A. Coat surfaces in contact with masonry and concrete with bituminous coating.

3.3 ERECTION

A. Erect stairs level and plumb, free form distortion, or defects detrimental to appearance or performance.

B. Do not field cut or alter members.

C. Coat surfaces in contact with masonry and concrete with bituminous coating.

D. Field bolts and weld to match standard of shop bolting and welding. Hide bolts and screws whenever possible. Where not hidden, use flush countersunk fastenings.

E. Butt mechanically fastened joints tight and flush with hairline joints. Grind welds smooth and flush.

3.4 ADJUSTING AND CLEANING

A. Touch-up field welds, bolted connections, and abraded areas of shop paint with field coat of same material used for shop painting.

END OF SECTION 05 51 00

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Free-Standing Steel Handrails.
   2. Landing and Guardrails.
   3. Wall Mounted Handrails and Brackets.

B. Related Sections include the following:
   1. Division 03 Section "Cast-in-Place Concrete", concrete fill in stair and landing pans.
   2. Division 09 Section "Painting", field paint finish.

1.3 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Furnish setting drawings and templates for installation of anchor bolts and other anchorage to be installed by others.

1.4 DESIGN REQUIREMENTS

A. Design and construct handrails to withstand the most stringent of a live load of not less than 200 pounds applied at any point, in any direction or a live load of 50 pounds per foot applied in any direction.

B. Design and construct guardrails to withstand loads transmitted by attached handrails or a horizontal live load of 50 pounds per linear foot applied at the top of the guardrail with a simultaneous downward live load of 100 pounds per foot, or a concentrated live load of 200 pounds applied at any point and any direction at the top of the guardrail, whichever condition produces maximum stresses.

C. Design and construct intermediate rails and panels to withstand a concentrated live load of 200 pounds over a 1 foot square area of the guardrail system including any open areas. In determining stress on guardrail members, this load need not be assumed to be acting concurrently with uniform horizontal loads on top rails of guardrails.

1.5 REFERENCES

A. Steel Structures Painting Council (SSPC) "Steel Structures Painting Manual," Fourth Edition, 1985, is used as a reference standard for bituminous coating, surface preparation, and shop paint application.

1.6 SUBMITTALS

A. Submit product data for the following:
   1. Wall mounted handrail brackets.
   2. Shop drawings for fabrication and erection of handrails, and guard rails.
   3. Indicate profiles, sizes, connection attachments, reinforcing, anchoring, openings, size and type of fasteners, and accessories.
   4. Include erection elevations and details where applicable.
   5. Indicate welded connections using standard AWS welding symbols.

B. Submit one reproducible sepia and one print of shop drawings. Only marked up sepia will be returned. Prepare shop drawings under seal of a Professional Structural Engineer registered in the State of Tennessee.

C. Shop drawings shall include the following note completed and signed by the Contractor:

   THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS.

1.7 QUALITY ASSURANCE

A. Comply with National Association of Architectural Metal Manufacturers (NAAMM) "Metal Stairs Manual," Fifth Edition, 1992, as minimum standard for construction, proportions, and dimensions.

B. Comply with American Welding Society (AWS) D1.1-96, "Structural Welding Code" for welding materials and processes, and for qualification of welding operators.

C. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements

D. Mockups: Build mockups Indicate portion of Work represented by mockup on Drawings or draw mockup as separate element.
   1. Build mockup of section as shown on Mock-up Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRE-INSTALLATION MEETINGS

A. Conduct the conference at the job site on a date and time set a minimum of 2 weeks in advance of beginning work.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, Installer, system manufacturer's

representative, adjacent materials Installer, and installers whose work interfaces with or affects the wall transition to the windows.

2. Review methods and procedures related to installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate and surrounding conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of walls and windows during and after installation.

B. Review governing regulations and requirements for insurance and certificates if applicable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For each product, one of the listed manufacturers:
1. Shop Paint:
a. Pittsburgh Paints, PPG Industries, Inc.
b. Sherwin Williams
c. Glidden / ICI Paints.
d. Tnemec Company, Inc.
2. Wall Rail Accessories:
a. J.G. Braun Company
b. Julius Blum and Company

2.2 MATERIALS

A. Structural Shapes and Plates: ASTM A36-96.

B. Steel Pipe: ASTM A53-96, Grade B, Schedule 40, unless indicated otherwise.

C. Miscellaneous Bar Shapes: ASTM A29-93a.

D. Steel Floor Plate: FS QQ-F-461, Class I, Checkered pattern.

E. Bolts: ASTM A307-94, Grade A.

F. Welding Materials: AWS D1.1-96, type required for materials being welded.

G. Shop Paint: Pittsburgh Paint G-9412 or equivalent by other acceptable manufacturer.

H. Bituminous Coating: SSPC Paint 12.

I. Wall Rail Accessories: Provide the following, or equivalent by other acceptable manufacturer.

1. Brackets: provide 2-1/4 inch clearance to wall and 1-1/2 inch vertical clearance from bottom of handrail to bracket.
   a. steel handrail bracket for 1-1/2 inch OD dia pipe rail: JG Braun, 1930F.
   b. steel handrail bracket for 1-1/2 inch OD dia pipe rail Julius Blum No. 621.

2.3 FABRICATION

A. Construct rails and guards to conform to sizes and arrangements shown.

B. Size members and connections to adequately support specified design loads.

C. Fabricate rails and guards of steel pipe, nominal (IPS) size as indicated.

D. Fabricate items with joints tightly fitted and secured. Weld joints unless otherwise indicated. Grind exposed welds flush and smooth with adjacent finished surfaces.

2.4 FINISH

A. Prior to cleaning, remove heavy deposits of oil and grease in accordance with SSPC SP-1 Solvent Cleaning.

B. Prior to painting, clean surfaces of rust, scale, and foreign matter, in accordance with SSPC SP-3 Power Tool Cleaning.

C. Paint in accordance with SSPC PA-1 Shop, Field, and Maintenance Painting.

D. Apply at rate to obtain 1.5 mil dry film thickness.

E. Do not paint surfaces in direct contact with concrete or where welding is required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify alignment with adjacent construction.

3.2 PREPARATION

A. Coat surfaces in contact with masonry and concrete with bituminous coating.

3.3 ERECTION

A. Erect rails and guards in alignment with other work, free form distortion, or defects detrimental to appearance or performance.

B. Do not field cut or alter members.

C. Coat surfaces in contact with masonry and concrete with bituminous coating.

D. Field bolts and weld to match standard of shop bolting and welding. Hide bolts and screws whenever possible. Where not hidden, use flush countersunk fastenings.

E. Butt mechanically fastened joints tight and flush with hairline joints. Grind welds smooth and flush.

3.4 ADJUSTING AND CLEANING

A. Touch-up field welds, bolted connections, and abraded areas of shop paint with field coat of same material used for shop painting.

END OF SECTION 05 52 13

SECTION 05 73 00 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   a. Decorative Metal Railing
   b. Refer to design drawings for railing design.
   c. All “non-public” areas requiring railing will be supplied with welded tube steel components as outlined in Section 05 50 00 and in Section 05 51 00.

B. Related Sections include the following:
   1. Division 05 Section "Steel Stairs" for railings at other locations.

1.2 DESIGN REQUIREMENTS

A. Design requirements are based on IBC and ADA standards:
   1. Guardrails and handrails shall meet or exceed all applicable building codes.
   2. Fabricate railings from high strength stainless steel to comply with structural requirements with an appropriate safety margin.
   3. All internal members shall be stainless steel, aluminum or nylon.
   4. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails:
      a. Uniform load of 50 lbf/ ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   2. Top Rails of Guards:
      a. Uniform load of 50 lbf/ ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   3. Infill of Guards:
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 square foot.
      b. Infill load and other loads need not be assumed to act concurrently.

1.3 SUBMITTALS

A. Samples: Provide 6 inch long handrail and guardrail samples complete with supports and covers to indicate stainless steel grade and finish.

B. Shop Drawings: Provide drawings for approval including plans, elevations, sections and details necessary to clearly indicate the design of the railing system and the method of attachment to the various building elements.

C. Structural computations: Provide structural design analysis data signed and sealed by the qualified professional engineer responsible for their preparation licensed in the state of the project to demonstrate satisfactory structural compliance to applicable building codes. Calculations, shall be based on Final Fabrication drawings.

D. Maintenance instructions: Provide manufacturers maintenance and cleaning instructions.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in original packing until installation.

B. Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ArtAco Railing Systems
50 Northeast 179th Street
Miami, Fl 33162 Ph 305- 652-8566

B. McNichols, Industrial & Architectural Hole Product Solutions
1980 Shiloh Road NW Building 6, #300
Kennesaw, Georgia 30114 Ph 1-877-884-4653 Fax 770-499-9559

C. Wagner Collaborative Metal Works
10600 West Brown Deer Rd
` Milwaukee, Wi 53224 Ph 414 214- 0444 Fax 414-214-0450

2.2 MATERIALS

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Rails and other tubular components:
1. Structural Shapes and Plates: ASTM A36-96.
2. Steel Pipe: ASTM A53-96, Grade B, Schedule 40, unless indicated otherwise.
3. Miscellaneous Bar Shapes: ASTM A29-93a.
4. Steel Floor Plate: FS QQ-F-461, Class I, Checkered pattern.
5. Bolts: ASTM A307-94, Grade A.
6. Welding Materials: AWS D1.1-96, type required for materials being welded.
7. Shop Paint: Pittsburgh Paint G-9412 or equivalent by other acceptable manufacturer.

C. Posts and other components:
1. Structural Shapes and Plates: ASTM A36-96.
2. Steel Pipe: ASTM A53-96, Grade B, Schedule 40, unless indicated otherwise.
3. Miscellaneous Bar Shapes: ASTM A29-93a.
4. Steel Floor Plate: FS QQ-F-461, Class I, Checkered pattern.
5. Bolts: ASTM A307-94, Grade A.
6. Welding Materials: AWS D1.1-96, type required for materials being welded.
7. Shop Paint: Pittsburgh Paint G-9412 or equivalent by other acceptable manufacturer.

D. Wall Rail Accessories: Provide the following, or equivalent by other acceptable manufacturer.
1. Brackets: provide 2-1/4 inch clearance to wall and 1-1/2 inch vertical clearance from bottom of handrail to bracket.
   a. 1-1/4" NPS (standard steel pipe)
   b. 1-1/2 inch handrail:
   c. JG Braun, 1/4 inch Formed Bracket Universal Saddle
2. Base Flanges: JG Braun Flat Base Flange.
3. Wall Return Brackets: JG Braun Flush Weld Wall Return
4. Plug: Julius Blum No. 608.

E. Fasteners: stainless steel or other materials as determined by engineering requirements with capability to sustain, without failure, load imposed within a safety factor of 4, as determined by testing per ASTM E488.
1. Dissimilar Metals: Type 304 stainless-steel fasteners.

2.3 FABRICATION

A. Fabricate railing system for compliance with structural requirements of applicable code.

B. Pre-assemble railings prior to shipping to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and for coordination with shop drawings.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and provide information on fastening point locations for posts.

3.2 INSTALLATION

A. Installation shall be by a qualified, authorized representative of the manufacturer.

B. Installation shall be in accordance with approved shop drawings.

C. Install components plumb and in-line, accurately fitted, free from distortion or defects and securely anchored to structure.
   1. Maintain horizontal alignment of infill panel pattern at adjacent panels, both where panels are horizontal and where panels are installed on a slope.

D. Provide anchors, plates, angles, etc., necessary for connecting railings to structure.

E. Field welding, if required, shall be by a certified welder.

F. All deficiencies in work and/or items not meeting specified requirements shall be corrected in order to meet specification requirements at no additional cost to Owner.

3.3 ERECTION TOLERANCES

A. Maximum variation from plumb shall be 1/4 inch.

B. Maximum offset from true alignment for every 50-foot of railing shall be 1/4 inch maximum, non-accumulative.

3.4 PROTECTION AND CLEANING

A. Provide protective covering on handrails and guardrails. Remove protective covering at Substantial Completion.

B. Clean railings, including infill panels, in accordance with manufacturer's recommendations.
   1. Wipe with moistened cloth only. Do not use cleaning agents with abrasive or acid/alkaline content.

END OF SECTION 05 73 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Provide zinc-coated fasteners in accordance with ASTM A 153 for fasteners in fire retardant and pressure treated wood.

C. Provide fire retardant wood products as indicated on the drawings and within these specifications following “Standard Test Method for Surface Burning Characteristics of Building Materials” in ASTM E84.

1.2 SUMMARY

A. This Section includes the following:
   1. Wood blocking and nailers.
   2. Wood furring and grounds.

B. Related Sections include the following:
   1. Division 06 Section "Sheathing."

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. NeLMA: Northeastern Lumber Manufacturers' Association.
   2. NLGA: National Lumber Grades Authority.
   3. SPIB: The Southern Pine Inspection Bureau.
   4. WCLIB: West Coast Lumber Inspection Bureau.
   5. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials

comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber).
1. Use treatment that does not promote corrosion of metal fasteners.
2. Use Exterior type for exterior locations and where indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

C. Fire retardant treated wood is manufactured under the independent third party inspection of Underwriters Laboratories Inc. (UL) Follow-Up Service and each piece shall bear the UL classified mark indicating the extended 30 minute ASTM E 84 test.

D. Materials shall be labeled kiln dried after treatment (KDAT). Timber Products Inspection, Inc. (TP) shall monitor the process and the TP mark shall appear on the label.

E. Materials shall be produced in accordance with ICC Evaluation Service Report 1791 (ESR-1791) latest version.

F. The structural performance of the fire retardant treated wood has been evaluated in accordance with ASTM D 5664 for lumber and ASTM D 5516 for plywood. Evaluation of plywood data is in accordance with ASTM D 6305. Evaluation of lumber data is in accordance with ASTM D 6841. The resulting design value and span rating adjustments are published in ICC Evaluation Report ESR-1791, which includes evaluation of high temperature (**HT**) strength testing for roof applications.

G. Treated plywood shall be manufactured under US Product Standard PS 1or PS 2. Panels shall have a minimum bond durability of Exposure 1.

H. Application: Treat items indicated on Drawings, and the following:
1. All Concealed blocking.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
2. Nailers.
3. Furring.
4. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 15 percent maximum moisture content of any species.

C. For concealed boards, provide lumber with 15 percent maximum moisture content and fire retardant treated in any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Hem-fir or hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where carpentry is: exposed to weather; in ground contact; pressure-preservative treated; fire retardant treated; or in area of high relative humidity; provide fasteners with hot-dip zinc coating complying with ASTM A153 or of Type 304 stainless steel.
      a. Fasteners other than nails, timber rivets, wood screws and lag screws may be mechanically deposited zinc coated steel with coating weights in accordance with ASTM B695, Class 55 minimum.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E488 conducted by a qualified independent testing and inspecting agency.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Do not splice structural members between supports, unless otherwise indicated.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
   1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

E. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as required by Authorities Having Jurisdiction.

F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. International Building Code, Chapter 23.

I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install

fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Provide fire retardant treated in all concealed wall, roof and floor assemblies and as required by code in exterior walls of all construction types.

B. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

C. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

END OF SECTION 06 10 53

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Provide zinc-coated fasteners in accordance with ASTM A153 for fasteners in fire retardant and pressure treated wood.

1.2 SUMMARY

A. This Section includes the following:
   1. Wall sheathing, gypsum and wood panel products.
   2. Parapet sheathing, inside face adjacent to roof, gypsum and wood panel products.
   3. Air Infiltration Barrier

B. Related Sections
   1. Division 04 Section "Unit Masonry" for concealed cavity wall flashing.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
   4. For building wrap, include data on air-/moisture-infiltration protection based on testing according to referenced standards.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC PS 2, unless otherwise indicated. Oriented Strand Board (OSB) is not acceptable

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.2 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA C9.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber).
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Use Exterior type for exterior locations and where indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

C. Fire retardant treated wood is manufactured under the independent third party inspection of Underwriters Laboratories Inc. (UL) Follow-Up Service and each piece shall bear the UL classified mark indicating the extended 30 minute ASTM E 84 test.

D. Materials shall be labeled kiln dried after treatment (KDAT). Timber Products Inspection, Inc. (TP) shall monitor the process and the TP mark shall appear on the label.

E. Materials shall be produced in accordance with ICC Evaluation Service Report 1791 (ESR-1791) latest version.

F. The structural performance of the fire retardant treated wood has been evaluated in accordance with ASTM D 5664 for lumber and ASTM D 5516 for plywood. Evaluation of plywood data is in accordance with ASTM D 6305. Evaluation of lumber data is in accordance with ASTM D 6841. The resulting design value and span rating adjustments are published in ICC Evaluation Report ESR-1791,

which includes evaluation of high temperature (**HT**) strength testing for roof applications.

G. Treated plywood shall be manufactured under US Product Standard PS 1or PS 2. Panels shall have a minimum bond durability of Exposure 1.

H. Application: Treat items indicated on Drawings, and the following:
   1. Plywood sheathing where indicated.

2.4 SHEATHING

A. Plywood Wall Sheathing: Exterior, Structural I sheathing.
   1. Nominal Thickness: as indicated on the drawings.

B. Interior Plywood Panels: Plywood backing for telephone/electrical, APA C-D plugged - in with exterior glue 3/4 inch minimum thickness, install with “C” face exposed.

C. Glass-Mat Gypsum Wall Sheathing: ASTM C1177.
   1. Thickness: minimum 1/2 inch thick.
   2. Size: 48 by 96 inches for vertical installation.
   3. Product: Subject to compliance with requirements, acceptable products include
      a. G-P Gypsum Corporation: Dens-Glass Gold.
      b. CertainTeed Corporation: GlasRoc Sheathing.

D. Fire-Rated Glass-Mat Gypsum Wall Sheathing: ASTM C1177, Type X:
   1. Thickness: minimum 5/8 inch thick.
   2. Size: 48 by 96 inches for vertical installation.
   3. Product: Subject to compliance with requirements, acceptable products include
      a. G-P Gypsum Corporation: Dens-Glass Gold Fireguard.
      b. CertainTeed Corporation: GlasRoc Sheathing.Type X.

E. Glass-Mat Gypsum Parapet Sheathing: ASTM C1177.
   1. Product: Subject to compliance with requirements, acceptable products include "Dens-Deck Prime" by G-P Gypsum Corporation.
   2. Thickness: minimum 1/2 inch thick.
   3. Size: 48 by 96 inches.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. For sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
   1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.
   1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C1002.
   2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C954.

2.6 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
      b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor V40 Weather Barrier Strips.
      c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.;Ice and Water Shield
      d. York Manufacturing: YorkSeal
      e. MFM Building Products Corp.; SubSeal-40.

C. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

D. Termination bars for flexible flashing: stainless steel, minimum 1 inch wide, with sealant ledge.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. "Fastening Schedule" in the International Building Code, Chapter 23.

D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Reference structural drawings for additional fastening requirements.

C. Fastening Methods: Fasten panels as indicated below:
   1. Wall and Roof Sheathing:
      a. Screw to cold-formed metal framing.
      b. Space panels 1/8 inch apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.
   1. Fasten gypsum sheathing to cold-formed metal framing with screws.
   2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
   3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.

C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
   1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

3.4 AIR INFILTRATION BARRIER INSTALLATION

A. General: Cover wood and gypsum sheathing with weather-resistant air infiltration barrier as follows:
   1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
   2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.

B. Sheet Type Building Wrap: Comply with manufacturer's written instructions.
   1. Seal seams, edges, fasteners, and penetrations with tape.
   2. Extend into jambs of openings and seal corners with tape.

3.5 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturers written instructions.
   1. Prime substrates as recommended by flashing manufacturer.
   2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
   3. Lap flashing over weather-resistant building paper at bottom and sides of openings.
   4. Lap weather-resistant building paper over flashing at heads of openings.
   5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.
   6. Install termination bar at top of flashing where flashing is surface applied to the backup wall. Apply sealant compatible with flashing to top of termination bar.

END OF SECTION 06 16 00

SECTION 06 18 13 – GLUED LAMINATED BEAMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes furnishing and installing all selected Manufactured materials and Products, including but not limited to:
   1. Structural glued laminated wood members.

B. Related Sections include the following:
   1. Division 01 GENERAL Requirements
   2. Division 01 Testing and Inspections
   3. Division 05 Cold Formed Metal Framing
   4. Division 06 Rough Carpentry
   5. Division 09 Light Gage Metal Framing
   6. Division 09 Gypsum Board

1.3 SUBMITTALS

A. Product Datacenter
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for glued laminated components and the finished product as well as the mounting configurations.

B. Shop Drawings
   1. Include typical dimensioned plans, elevations and cross-section(s) or each component glued laminated and mounting configuration components, indicating
      a. Dimensions as shown on the drawings.
      b. Finish as shown on the drawings.
      c. Samples: For each exposed product and for each color and texture specified.
         1) Size: 12 inches
   2. Provide Qualification of Installers

C. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements

B. Comply with the following as a minimum requirement:

1. AITC 117 - Structural Glued laminated Timber of Softwood Species.
2. ASTM D3737 - Design and Manufacture of Structural Glued Laminated Timber.
3. NSI/ATC A190.1 - Standard Specifications for Glued Laminated Timber.
4. WCLIB - Standard Grading and Dressing Rules.

C. Beams to comply with CBC Chapter 23.

D. Special inspection of structural-glued laminated members shall be performed during fabrication by an inspector approved by DSA. Inspection shall be performed in accordance with CBC Chapter 17A.

1.5 PRE-INSTALLATION MEETINGS

A. Conduct the conference at the job site on a date and time set a minimum of 2 weeks in advance of beginning work.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, Installer, system manufacturer's representative, adjacent materials Installers, and installers whose work interfaces with or affects the wall transition to the windows.
2. Review methods and procedures related to installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate and surrounding conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of walls during and after installation.
6. Discuss governing regulations and requirements for insurance and certificates.

1.6 DELIVERY, STORAGE, AND HANDLING

A. After fabrication and prior to shipping, seal surfaces of each member, including ends, with two coats of sealer primer, installed in accordance with manufacturer's written recommendations.

B. Each member, which will be exposed in completed structure, shall be separately wrapped in heavy waterproof paper for protection against weather and damage in shipping and handling. Do not remove wrapping until after members have been installed. Protect all members from damage, whether concealed or exposed in the finished Work.

1.7 PROJECT CONDITIONS

A. The timing of the installation shall comply with the manufacturer's recommendation for temperature, humidity and exposure to weather.

1.8 WARRANTY

A. Manufacturer's full system warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers, basis of design: Product specifications are based upon the first named manufacturer. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Structural Wood systems, Greenville, Alabama
   2. Laminated Timbers, London, Kentucky
   3. ArkLam, Magnolia, Arkansas

B. Substitutions will only be permitted if the procedures are followed in Division 01.

C. Lumber for Laminating: Conforming to the structural requirements and laminating specifications of AITC 117, of stress grades and combination indicated that provides glued laminated members with allowable stress values in bending as indicated.

D. B. Glue: Exterior type; waterproof.

2.2 FABRICATION

A. Appearance grade of members shall be Industrial Grade where concealed and Architectural Grade where exposed.

B. B. Weather exposed surfaces of members as defined in CBC shall be protected to prevent decay. When member is protected with pressure treatment, treatment process shall not impair structural integrity of member. When member is protected by flashing or is encased, provide ventilation and prevent moisture entrapment on member.

C. Joints: End joints in adjacent laminations shall be separated in accordance with CBC requirements. Joints in adjacent laminations of arched members shall be separated as required for bending members.

D. Maximum moisture content of the wood at time of gluing shall not exceed 16 percent for Projects located in coastal areas, 12 percent for Projects located in interior valleys or 10 percent for Projects located in desert areas, with geographical areas determined by DSA. Moisture content of wood for members that will be exposed to direct sunlight in finished structure shall not exceed 10

percent at time of gluing. Range of moisture content of laminations assembled into a single member shall not exceed 5 percent at time of gluing.

E. Reinforcement for Radial Tension: Where mechanical reinforcement is required to resist radial tension, reinforcement shall be as described in the Timber Construction Manual. Maximum spacing of mechanical reinforcement shall not exceed half effective depth of member at location of reinforcement.

F. Notches: Notched glued laminated members shall be designed as required for sawn lumber using allowable stress of a combination, with outer lamination being grade of laminations exposed by notch. Where a notch is located on tension face of a member, at least one fully-threaded lag bolt, or equal, shall be provided on each side of notch to prevent splitting.

G. Fabricate and assemble components for laminations in combinations in accordance with requirements of AITC 117 and ASTM D3737.

2.3 ACCESSORY MATERIALS

A. Mounting: The manufacturer will be responsible for designing the connection to the adjacent building components.
   1. The mounting components will be designed to match the design intent shown on the drawings. Deviation from the design shown must be approved in writing by the architect.
   2. Drawings and calculations will be provided by an engineer with a stamp for the state in which the project is located.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect surrounding and adjacent work as required preventing damage to preceding work during execution of this work.

B. Perform all preparation necessary for a successful installation of products as specified in manufacturer’s installation instructions.

3.2 INSTALLATION

A. Obtain Manufacturer’s instructions for successful installation of work to be performed and become knowledgeable with all material handling and installation recommendations.

B. Ensure full compliance with Manufacturer’s instructions in all aspects of tasks required by this work. Install products in accordance with manufacturer’s instructions at locations indicated on the drawings.

C. Coordinate all work with other project trades to assure proper installation and provide proper accommodations for following work by other trades.

D. Erection: Provide erection bracing in addition to required lateral bridging. Avoid temporary construction loads in excess of design limits. Maintain members straight and plumb. Provide adequate lateral support for individual members and entire system until permanent bridging and sheathing is installed. Deliver and erect each member in one piece. Field splicing is not permitted unless reviewed by the Architect.

E. An engineering approval letter from the responsible design engineer will be required prior to all cutting, reaming, re-drilling and adjustments to alignment adjustments to the previously approved building components.

F. Correction of minor misfits and a reasonable amount of cutting, reaming, re-drilling or alignment with drift pins will be considered a legitimate expense of erection.

3.3 FIELD QUALITY CONTROL

A. After installation, check all work for flaws and defects.

B. Repair all defective work.

C. Remove and replace all damaged components that cannot be successfully repaired as determined by the Architect.

3.4 PROTECTION

A. Protect surfaces from damage until Date of Substantial Completion. Repair or replace damaged components that cannot be repaired to architect’s satisfaction.

B. Fabricator/Installer to provide a Maintenance kit and shall review maintenance procedures and the product warranty with the Owner's maintenance personnel upon completion of project.

3.5 CLEANING

A. Remove all protection materials.

B. Clean all surfaces following manufacturer’s recommendations prior to final project completion. Do not use harsh cleaning materials or methods that would damage finish.

C. Dispose properly of all debris generated by this work, protection materials and cleaning materials.

END OF SECTION 06 18 13

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Laminate Clad Casework
2. Plastic Laminate Tops, standard and postformed.
3. Accessories.

B. Related Sections include the following:
1. Division 06 Section "Rough Carpentry"
2. Division 06 Section "Solid Surface Fabrications" for window sills.

1.3 REFERENCES

A. Architectural Woodwork Institute (AWI) "Quality Standards, Guide Specifications and Quality Certification Program", most recent addition, is used as reference standard for quality grade, workmanship, and grade of material, and factory finish system.

B. AWI "Architectural Casework - General Details and Specification Guide" is used as a reference standard for casework design.
1. This standard is referred to as "AWI Architectural Casework".

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm experienced in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.

C. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Custom Quality Standards" published by the Architectural Woodwork Institute (AWI) except as otherwise indicated.

D. Comply with "AWI Architectural Casework" for casework design and construction details.

E. Submit on shop drawings, fabricator's certification that architectural woodwork complies with the specified AWI quality grade.

1.5 SUBMITTALS

A. Submit manufacturer's product data for each product and process specified as work of this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation including the following:
   1. Cabinet Hardware.
   2. Sealer.

B. Submit shop drawings for fabrication and erection of casework.
   1. Include dimensioned plans and elevations, using same reference to room numbers as those on Contract Documents.
   2. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes.

C. Submit the following samples:
   1. Plastic laminate, color chip for each type, color, style and pattern.
   2. PVC Edge banding in appropriate size specified where Plastic Laminate tops are used.
   3. Exposed cabinet hardware, when required by Architect
   4. One unit of each type of cabinetry (i.e., wall, base, drawer, etc.) when required by Architect

D. Submit woodwork Manufacturer's (Fabricator's) certification, stating that fabricated woodwork complies with quality grades and other requirements indicated

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soiling, and deterioration.

B. Do not deliver woodwork, until painting, wet work, grinding, and similar operations which could damage, soil, or deteriorate woodwork have been completed in installation areas.

1.7 PROJECT CONDITIONS

A. Conditioning: Woodwork Manufacturer and installer shall advise Contractor of temperature and humidity requirements for woodwork installation and storage areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.

B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. Require Woodwork Manufacturer to establish optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Plastic Laminate:
1. Wilsonart International.
2. Formica Corporation.
3. Nevamar Corporation.
4. Pionite (Alliance Products Company)

B. Solid Surface Material: Refer to Division 06 Solid Surface Fabrications

B. Drawer Slides:
1. Knape & Vogt.
2. Grant Hardware Co.
3. Hafele.
4. Sterling
5. Stylmark

C. Casework Door Hinges:
1. Stanley Hardware.
2. Grass America, Inc.
3. Hafele.
4. Julius Blum, Inc
5. Hettich America

D. Casework Door and Drawer Pulls:
1. Stanley Hardware.
2. Builders Brass.
3. Hafele.
4. Grant Hardware Co.

E. Casework Shelf Standards and Supports:
1. Knape & Vogt.
2. Stanley Hardware.
3. Hafele.

F. Casework Door and Drawer Locks:
1. Corbin Cabinet Lock.

2.2 CASEWORK

A. Comply with Sections 400 and 400B of AWI Quality Standards.

B. Quality: Custom grade, in accordance with AWI Quality Standards.

C. Construction: Flush Overlay, in accordance with AWI Architectural Casework.

D. General Cabinet Requirements:

1. All cabinet backs shall be minimum 1/2 inch thick, and shall be inset 3/4 inch from rear and completely housed and captured in bottom, sides and sub-top of cabinets and sealed to cabinet with continuous hot melt glue and rear stiffeners screwed and glued. Stapled backs shall not be accepted.
2. Cabinet sides may not extend to floor. Construct base and tall cabinets with separate, continuous base, minimum of 3/4 inch thick and moisture resistant.
3. Band all edges of door and drawer fronts with 3mm PVC edge banding, color to be selected. Band cabinet edges with 1 mm PVC edge banding.
4. Fabricate cabinets with a 1 inch thick installation rail on back of cabinet for attaching to wall.
5. Fabricate cabinets with a minimum 3/4 inch thick core before laminate. Finished thickness shall be not less than 13/16 inch.
6. Tops and bottoms of all wall cabinets shall be 3/4 inch thick, unless noted otherwise.
7. Door/Drawer Spreaders: Provide minimum 3/4 inch by full width cabinet body spreaders immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions and close off reveal.
8. All particleboard shall be industrial grade, medium density 40 to 50 pounds per cubic foot, 3/4 inch thick. Particleboard shall meet the minimum standards listed in ASTM D 1037 and CPA A208.1.
9. Wood grain to run vertically for all wood veneer and wood grain plastic laminate.
10. Provide countertop end splashes at all conditions where cabinet abuts wall. EXCEPTION: End splashes are not required where postformed counter tops are indicated.

E. Detailed Cabinet Requirements:

1. Sub-Base: Cabinet Sub-base shall be separate and continuous (no cabinet body sides-to-floor), moisture resistant, with concealed fastening to cabinet bottom. Provide ladder-type construction, of front, back and intermediates, to form a secure and level platform to which cabinets attach.
2. Cabinet Base Top: Provide solid sub-top for all lower base cabinets.
3. Cabinet Ends: Provide 1 inch thick end panels on units over 4 feet tall. Provide adjustable tracks or holes drilled for adjustable shelves 1 inch+/- on center.
4. Fixed and Adjustable Shelves Thickness: Provide 3/4 inch standard shelving less than 36 inches wide. Provide one inch shelving for units 36 inches wide and less than 48 inches.
5. Pin Hole Method. Holes shall be drilled on the interior surface of the cabinet side walls. Holes shall be evenly spaced in two vertical columns The holes in each column shall be spaced at 1 inch increments starting 6 inches from the cabinet interior bottom and extending to within 6 inches of the top interior surface of the cabinet. Holes shall be drilled to provide a level, stable surface when the shelf is resting on the shelf pins. Hole diameter shall be coordinated with pin insert size to provide a firm, tight fit.
   a. Finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

6. Cabinet Back: Standard cabinet back shall be 1/2 inch thick. Rear, unexposed, side of back shall receive continuous hot melt glue at joint

between back and sides/top/bottom for sealing against moisture and vermin, and further contribute to case rigidity.

7. Mounting/Support Rails: cover visible faces and edges with plastic laminate.
8. Wall Cabinets: provide minimum 14 inch clear inside depth.

F. Drawers:
1. Drawer fronts shall be applied to separate drawer body component sub-front.
2. Sides and back of drawers shall be 1/2 inch minimum solid wood; sub-front same, except 5/8 inch thick.
3. Drawer sides to be dadoed to receive front and back, machine squared and held under pressure while glued and pinned together.
4. Drawer bottom shall be 1/4 inch thick, housed and glued into front sides and back. Underside of drawer to receive continuous hot melt glue at joint between bottom and back/sides/font for sealing and rigidity. Reinforce drawer bottoms as required with intermediated spreaders.

G. Vertical and Horizontal Dividers: Provide one of the following as indicated on the drawings:
1. Tempered hardboard 1/4 inch thick, smooth both faces. Secured in cabinet with molded plastic clips.
2. Laminated particle board 3/4 inch thickness. Secured in cabinet with clips. At exposed dividers, provide laminated plastic finish to match faces.
3. Melamine plastic sheets 1/4 inch thick, with finished edges.

H. Grommets:
1. Where indicated in countertops and elsewhere, provide metal or molded plastic grommets that are the full thickness of the surface they penetrate. If metal is provided, provide same finish as other adjacent metal hardware. If plastic is provided, provide color as selected by Architect from manufacturer's available colors. Provide size indicated, or if not indicated, 2 inch diameter.

I. Materials:
1. Provide materials for laminate clad finish.
2. Exposed Surfaces: High pressure plastic laminate, Grade 1, color as indicated in drawings on Room Finish Legend and Room Finish Schedule or as selected by Architect.
3. PVC Edge banding:
   a. 3mm for door and drawer edges.
   b. 1mm for cabinet faces.

J. Casework Hardware:
1. Hinges: for flush overlay.
   a. Grass 3903 for Flush Overlay, 165 degree.
   b. Blum BH71T6580, (170 degree self-closing) with 174H7100 mounting plate.
2. Drawer Slides:
   a. File Drawers: full extension, minimum 150 pound capacity, ANO finish, KV 8520.

b. Other Drawers: full extension, minimum 100 pound capacity, ANO finish, KV 8414.

3. Door and Drawer Pulls: Stanley 4484, brushed aluminum or US26D finish.
4. Pencil Drawer: Hafele model 429.57.300, with ball bearing slides.
5. Shelf Supports: pin hole, dual peg locking support.
6. Hanging File Rails: black PVC rails, sized to fit drawer side panel thickness, typically 3/4 inch thick, verify.
7. Lateral File Rails: metal brackets with 1/8 inch by 3/4 inch aluminum bars.

K. Support Brackets: A&M Hardware Inc.
1. Size: 18 x 24 for typical countertop.
2. Brunswick Countertop Support Bracket 2” wide x 24”deep x 24” high
3. Provide other sizes where indicated on the drawings or required.

L. Wall Mounted Shelving Standards and Brackets 12” deep
1. Brunswick Countertop Support Bracket 2” wide x 10”deep x 10” high
2. Mount no more than 48” oc horizontally.

M. Wall Mounted Shelving Standards and Brackets 16” to 18” deep
1. Brunswick Countertop Support Bracket 2” wide x 16”deep x 16” high
2. Mount no more than 48” oc horizontally.

N. Wall Mounted Shelving Standards and Brackets 20” deep
1. Brunswick Countertop Support Bracket 2” wide x 20”deep x 20” high
2. Mount no more than 48” oc horizontally.

O. Wall Mounted Shelving Standards and Brackets 24” deep
1. Brunswick Countertop Support Bracket 2” wide x 24”deep x 24 ” high
2. Mount no more than 48” oc horizontally.

2.3 PLASTIC LAMINATE TOPS

A. Comply with Section 400C of AWI Quality Standards.

B. Quality: Custom grade in accordance with AWI Quality Standards.

C. Provide post-formed bullnose edges at all wet locations.

D. Materials:
1. Core: marine grade plywood at sink location, exterior grade plywood at other locations.
2. Overlay Panels: High pressure decorative laminate, scuff and abrasive resistant with .001 mm minimum deposit of aluminum oxide particles, complying with NEMA LD 3, FS LP 508, Grade 1, solid colors as selected.
3. Provide backing sheet for each top.
4. 3mm PVC edge banding.
5. Provide countertop end splashes at all conditions where cabinet abuts wall. EXCEPTION: End splashes are not required where postformed counter tops are indicated.
6. Laminate countertop substrate shall be constructed of 3/4 inch veneer core plywood. The substrate shall be moisture-resistant where countertops

receive sinks, lavatories, or are subjected to liquids. All substrates shall have sink cutout edges sealed with appropriate sealant against moisture. No joints shall occur at any cutouts. A balanced backer sheet is required.

2.4 SOLID SURFACING MATERIAL TOPS

. A. Solid surfacing material tops shall be 1/2 inch for horizontal applications.

B. Solid surfacing material backsplashes shall be 1/2 inch thick.

C. Physical properties shall conform to the manufacturer's standard specifications. The material shall be homogenous, not coated or laminated.

D. Superficial damage to a depth of 0.10" shall be repairable by sanding.

E. Use adhesive recommended by manufacturer for adhering to substrate.

F. Provide ¾" plywood as substrate for all Solid Surface Material. Utilize manufacturer's recommended adhesive for vertical and horizontal applications.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Prime paint surfaces of items or assemblies in contact with cementitious materials, before installation.

B. All surfaces to be laminated are to be inspected to determine that they are sound, clean and free of surface defects.

C. For solid surfacing material, precondition the substrate to 75 degrees F and 35 to 45 percent relative humidity for a minimum of 48 hours prior to fabrication. Machine factory edges prior to any seaming and clean thoroughly with denatured alcohol.

3.2 WORKMANSHIP

A. Cabinet parts shall be accurately machined and bored for premium quality grade joinery construction utilizing automatic machinery to insure consistent sizing of modular components.

B. End panels shall be doweled to receive bottom and top. Back shall be fully housed into cabinet sides, top and bottom to insure rigidity and a fully closed cabinet.

C. Drawer bottom shall be fully housed into sides, back and subfront. Sides of drawer to be fully dadoed to receive drawer back, locked in fully to sub-front, fastened with glue and mechanical fasteners.

D. Apply 3/4 inch thick hanging rails or cleats to back side of all wall, base and tall cabinets for extra rigidity and to facilitate installation. Rails, cabinet backs,

drawer bottoms shall be additionally secured by a continuous bead of hot melt glue.

E. All cases shall be square, plumb and true.

F. Provide removable back panels and closure panels for plumbing access where shown on drawings.

3.3 INSTALLATION

A. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8' -0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.

B. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final.

D. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Install to a tolerance of 1/8 inch in 8 feet for plumb and level; and with 1/16 inch maximum offset in flush adjoining surface, 1/8 inch maximum offsets in revealed adjoining surfaces. Embed backsplashes on countertops in full bed of sealant.

E. Tops: Anchor securely to base units and other support systems as indicated.

F. Countertop end splashes shall be installed at all conditions where cabinet abuts wall, except as noted above.

G. After countertops and cabinets are properly attached to wall, all joints at tops and cabinets will be caulked with a color matched caulk.

H. Install cabinets where possible with concealed fasteners. Where exposed fasteners are required such as to attachment of open wall cabinets to wall, provide anchors with colored heads on.

I. Provide color coordinated snap-cap washers and caps for all exposed screw heads, equal to those manufactured by Pro-Dec Products, Kappets, Stafford, TX.

J. Solid Surfacing Materials:

1. Material, equipment and workmanship should conform to the industry standard practices, conditions, procedures and recommendations as specified by ANSI/NEMA LD3-1995 Section 4, Architectural Woodwork Quality Standards and DLPA/ANSI 161.2-1979 standards.
2. Position seams away from stress areas such as inside corners.
3. Use only mild solvents such as naptha, mineral spirits, or isopropyl alcohol. Do not pour solvent on the surface. Solvent should be applied to surface on a clean sloth and then wiped with a clean, dry cloth.

3.4 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION:

A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

D. Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

END OF SECTION 06 40 23

SECTION 06 61 16 - SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Solid surfacing window sills.
   2. Solid surfacing lavatory countertops.

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" in-wall blocking for attachment of lavatory tops.
   2. Division 07 Section Joint Sealants.
   3. Division 22 Sections for plumbing fixtures.

1.3 SUBMITTALS

A. Product Data:
   1. Detailed specification of construction and fabrication.
   2. Shop drawings indicating construction, attachment and bracing.
   3. Manufacturer's installation instructions.
   4. Manufacturer's detailed recommendations for handling, storage, installation, protection, and maintenance.

B. Shop Drawings: Installation details including location and layout of each type of fabrication and accessory.

C. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

D. Samples: Full range of colors and patterns.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, including specific requirements indicated.
   1. Certified by manufacturer.

B. Installer Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, including specific requirements indicated.
   1. Acceptable to or licensed by manufacturer.

C. Source Limitations: Obtain materials and products from single source.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver fabrications appropriately wrapped in protective materials.

B. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.6 PROJECT CONDITIONS

A. Maintain relative humidity planned for building occupants and an ambient temperature between 65 - 75 degrees F for 48 hours prior to and during installation. After installation, maintain relative humidity and ambient temperature planned for building occupants.

1.7 WARRANTY

A. Furnish manufacturer’s limited 10 year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers, basis of design: Product specifications are based upon the first named manufacturer. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Aristech Acrylics LLC - Avonite Surfaces.
      a. Class G
      b. Class B
      c. Class F1
   2. Wilsonart International - Gilbraltar.
   3. LG - HI-MACS
   4. DuPont - Corian

2.2 MATERIALS

A. Solid surface material with the following properties.
   1. Nominal sheet thickness: 1/2 inch.
      a. Provide finished or "built-up" thickness as detailed on the drawings.
   2. Finish: Satin

3. Surface burning characteristics in accordance with ASTM E84, Class I or Class A.
4. Liquid Absorption, ISO 4586-2, for 1/2 inch material thickness: 0.4 percent after 2 hour period.

B. Color: as indicated on the Finish Schedule.

2.3 ACCESSORY MATERIALS

A. Plywood substrate: A-C grade plys, with exterior glue, 3/4 inch thick, unless indicated otherwise on the drawings.

B. Sink/bowl mounting hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.

C. Joint adhesive: Manufacturer’s standard adhesive to create inconspicuous, nonporous joints, with a chemical bond.

D. Use adhesive recommended by manufacturer for adhering to substrate.

E. Sealant: Standard mildew resistant, FDA/UL recognized silicone sealant in color matched or clear formulations.

2.4 FABRICATION

A. Fabrication to be performed by a solid surface fabricator/installer certified by the manufacturer.

B. Fabricate components in shop to greatest extent practical to size and shape indicated, in accordance with approved shop drawings and manufacturer's published requirements.

C. Form joints between components using manufacture’s standard joint adhesive. Joints shall be inconspicuous in appearance and without voids.

D. Rout and finish component edges to a smooth, uniform finish. Rout all cutouts then sand all edges smooth. Repair or reject defective or inaccurate work.

E. Finish: Surfaces shall have a uniform finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Precondition Solid Surfacing fabrications in accordance with manufacturer's printed installation instructions.

3.3 INSTALLATION

A. Install units plumb, true and level in accordance with approved shop drawings, project installation details and manufacturer's printed instructions.

B. Form joints using manufacturer's approved adhesive, with joints inconspicuous in finished work.

C. Provide minimum 1/8 inch expansion gaps on both sides of window stools, sealed with manufacturer's approved sealant.

D. Ease edges and sand smooth.

E. Remove excessive adhesive and sealants. Components shall be clean on Date of Substantial Completion.

F. Install window stools full length of window, set securely into place using only concealed fasteners and manufacturer's approved adhesive.

3.4 PROTECTION

A. Protect surfaces from damage until Date of Substantial Completion. Repair or replace damaged components that cannot be repaired to architect's satisfaction.

B. Fabricator/Installer to provide a Maintenance kit and shall review maintenance procedures and the product warranty with the Owner's maintenance personnel upon completion of project.

3.5 PROTECTION

A. Protect installed materials from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where material is subject to abuse.

END OF SECTION 06 61 16

SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Cold-applied, emulsified-asphalt dampproofing.

B. Related Sections include the following:
   1. Division 07 Section "Self-Adhering Sheet Waterproofing" for waterproofing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

B. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

PART 2 - PRODUCTS

2.1 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

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:
   1. Degussa Building Systems; Sonneborn Hydrocide 600.
   2. Meadows, W. R., Inc. Sealmastic Emulsion Type I

B. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

C. VOC Content: 0.25 lb/gal. or less.

2.2 MISCELLANEOUS MATERIALS

A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

B. Patching Compound: Manufacturer's fibered mastic of type recommended by dampproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
   1. Proceed with dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections.

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

1. Apply additional coats if recommended by manufacturer or if required to achieve coverages indicated.
2. Allow each coat of dampproofing to cure in accordance with manufacturer's recommendations before applying subsequent coats.

B. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior.
1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.
2. Extend 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

C. Apply dampproofing to provide continuous plane of protection on exterior face of inner wythe of exterior masonry cavity walls.
1. Lap dampproofing at least 1/2 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
2. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe, and lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. On exterior face of inner wythe of cavity walls: Apply brush or spray coat at not less than 1 gallon per 100 sq. ft..

3.5 CLEANING

A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 07 11 13

SECTION 07 13 26 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Modified bituminous sheet waterproofing.

B. Related Sections include the following:
   1. Division 07 Section "Joint Sealants" for joint-sealant materials and installation.

1.3 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain waterproofing materials through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.

C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

D. Store rolls according to manufacturer's written instructions.

E. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
   1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Not less than 60-mil- thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil- thick, polyethylene film with release liner on adhesive side.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. Carlisle Coatings & Waterproofing Inc.; CCW MiraDRI 860/861.
      b. Grace, W. R. & Co.; Bituthene 3000.
      c. Meadows, W. R., Inc.; SealTight Mel-Rol.
   2. Physical Properties:
      a. Tensile Strength: 250 psi minimum; ASTM D412, Die C, modified.
      b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
      c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970.
      d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C836.
      e. Puncture Resistance: 40 lbf minimum; ASTM E154.
      f. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D5385.
      g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.
      h. Vapor Permeance: 0.05 perms; ASTM E96, Water Method.

2.2 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

B. Primer: Liquid primer recommended for substrate by manufacturer of sheet waterproofing material.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.

F. Sheet Strips: Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.

G. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

H. Protection Course:
   1. Extruded-polystyrene board insulation, unfaced, ASTM C578, Type X, 1/2 inch thick.

I. Drain Pipe: ADS Single Wall Corrugated Polyethylene Perforated Pipe.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
   1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
   2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.
   1. Install sheet strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.

F. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D6135.

G. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D6135.

3.3 MODIFIED BITUMINOUS SHEET WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and according to recommendations in ASTM D6135.

B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

D. Apply continuous sheets over sheet strips bridging substrate cracks, construction, and contraction joints.

E. Seal exposed edges of sheets at terminations not concealed by metal counterflashings or ending in reglets with mastic.

F. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

G. Install protection course with butted joints over waterproofing membrane immediately.

H. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.4 PROTECTION AND CLEANING

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 13 26

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Exposed (plenum) glass fiber batt building insulation.
   2. Concealed and exposed unfaced glass fiber batt building insulation.
   3. Concealed extruded foam insulation board and galvanized Zee furring channels.
   4. Sound Attenuation Batt Insulation.

B. Related Sections include the following:
   1. Division 07 Section "SBS Modified Bituminous Membrane Roofing" for insulation specified as part of roofing construction.
   2. Division 07 Section "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for insulation specified as part of roofing construction.
   3. Division 22 Section "Plumbing Insulation."
   4. Division 23 Section "HVAC Insulation."

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E84, Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM E96, Test Method for Water Vapor Transmission of Materials.
   3. ASTM E136, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
   4. ASTM C177, Test Method for Steady State Thermal Transmission Properties by means of Guarded Hot Plate.
   5. ASTM C518, Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter.
   6. ASTM C553, Standard Specification for Mineral Fiber Blanket and Felt Insulations.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
   1. Surface-Burning Characteristics: ASTM E84.
   2. Fire-Resistance Ratings: ASTM E119.
   3. Combustion Characteristics: ASTM E136.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protection for Plastic Insulation:
   1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
   2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

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 manufacturers specified in other Part 2 articles below.

2.2 GLASS-FIBER BLANKET INSULATION

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   1. CertainTeed Corporation.
   2. Guardian Fiberglass, Inc.
   3. Johns Manville.
   4. Knauf Fiber Glass.
   5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation (fully concealed): ASTM C665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
   1. Nominal 6-1/4 inches thick with a minimum thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F.

C. Faced Glass-Fiber Blanket Insulation (exposed in plenum): ASTM C665, Type III, Class A, Category 1, (blankets with membrane facing); with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
   1. Nominal 6-1/4 inches thick with a minimum thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F.

D. Insulation width to provide friction fit for stud spacing indicated.

2.3 CONCEALED EXTRUDED FOAM INSULATION

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   1. Dow Chemical Company.
   2. Owens Corning.
   3. DiversiFoam Products.
   4. Pactiv Building Products Division.

B. Extruded polystyrene board insulation: ASTM C578, of Type IV, 2 inches thick, square edge with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively.

C. Auxillary Materials
   1. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of minimum 7/8 inch, minimum bare-metal thickness of 0.0179 inch (25 gage), or 0.0329 inch (20 gage) and 2 inch depth.
   2. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates. Provide hot-dip galvanized or stainless steel fasteners for attaching framing to exterior masonry walls.

2.4 SOUND ATTENUATION BATTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
   1. Owens Corning.
   2. Johns Manville.
   3. CertainTeed Corporation.
   4. Guardian Fiberglass, Inc.

B. Un-faced glass fiber acoustical insulation complying with ASTM C 665, Type 1.

C. Size: Thickness 4” nom; Width 16” nom; Length Full Height of Wall.

D. Surface burning Characteristics: Max Flamespread 10, Max Smoke Developed 10 when tested in accordance with ASTM E84

2.5 ACCESSORY MATERIALS

A. Self-Sticking, Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.

B. Mechanical retainers (for batt insulation): 13 gage tension wire, cut for metal stud spacing. Nominal 3/4 inch wide, 26 gage galvanized sheet metal strips screw attached to the metal stud face will also be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Install insulation in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   3. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically.

C. Install faced insulation with the facing to the "inside" or exposed side.

3.5 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 22 00 – ROOF AND DECK INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Composite Roof and Insulation Decking for Sloped Roofs

B. Related Sections include the following:
   1. Division 05 Section “Metal Decking”
   2. Division 07 Section "Fiberglass Asphalt Composite Shingles”.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E 108 – Standard Test Methods for Fire tests of Roof Coverings
   2. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials
   3. UL 263 – Fire Tests of Building Construction Materials
   4. UL 790 – Standard Test methods for Fire Tests of Roof Coverings
   5. UL 1256- Fire Tests of Roof Deck Constructions
   6. ASTM E 2114-01 Standard Terminology for Sustainability Relative to the Performance of Buildings
   7. ASTM E2129-01 – Standard Practice for Data Collection for Sustainability Assessment of Building Products.
   8. ASTM C1289, Type V

1.4 SUBMITTALS

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

B. Samples: Submit 6x 6 inch samples with manufacturer’s recommended fasters of each board type required

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and

inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E84.
2. Fire-Resistance Ratings: ASTM E119.
3. Combustion Characteristics: ASTM E136.
4. UL 1256

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protection for Plastic Insulation:
   1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
   2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

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 manufacturers specified in other Part 2 articles below.

2.2 The basis of design follows the Atlas Roofing Corporation AC FOAM Nailbase System Components:
   1. Panels shall be 4’x8’ panels at a maximum of 6.5” thick. Refer to construction drawings for composite system thickness.
   2. Polyiso board 4” bonded to 7/16” APA/TECO rated OSB on the top side and a fiber reinforced felt facer on the bottom.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install material that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply panels to substrates by method indicated, complying with manufacturer's written instructions.

B. Apply vapor retarder over metal decking with a perm rating of .5 or less (i.e. 4 mil polyethylene minimum).

C. Install with end joints staggered to avoid having insulation joints coinciding with joints in deck.

3.5 PROTECTION

A. Protect installed material from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where material is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Weather barrier membrane.
   2. Seam Tape.
   3. Flashing.
   4. Fasteners.

B. Related Sections include the following:

1.2 REFERENCES

A. ASTM International
   1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
   2. ASTM C1193; Standard Guide for Use of Joint Sealants
   3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
   4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
   5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
   6. ASTM E96; Test Method for Water Vapor Transmission of Materials
   7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
   8. ASTM E2178; Test Method for Air Permeance of Building Materials

B. AATCC - American Association of Textile Chemists and Colorists
   1. Test Method 127 Water Resistance: Hydrostatic Pressure Test

C. TAPPI
   1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
   2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 SUBMITTALS

A. Product Data: Submit manufacturer current technical literature for each component.

B. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.

C. Quality Assurance Submittals
   1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
   2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
   3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly

installation.

D. Closeout Submittals
1. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.4 QUALITY ASSURANCE

A. Qualifications
1. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store weather barrier materials as recommended by weather barrier manufacturer.

1.6 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: High-performance, flash spun-bonded olefin, non-woven, non-perforated, secondary 19805; 1.800.44TYVEK (8-9835); http://construction.tyvek.com. Products of "equal" type and performance may be substituted.

2.2 MATERIALS

A. Basis of Design: High-performance, flash spun-bonded olefin, non-woven, non-perforated, secondary weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.

B. Performance Characteristics:

1. Air Penetration: 0.001 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E 2178. Type I per ASTM E 1677.
2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E 96, Method B.
3. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
4. Basis Weight: Minimum 2.7 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.
5. Air Resistance of Paper: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
6. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D 882, Method A.
7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D 1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

2.3 ACCESSORIES

A. Seam Tape: DuPont™ Tyvek® Tape as manufactured by DuPont™ Building Innovations™.

B. Fasteners
1. Masonry Construction: Masonry tap-con fasteners with Tyvek® Wrap Caps as manufactured by DuPont™ Building Innovations™: 2-inch diameter plastic cap fasteners

C. Sealants
1. Refer to Section 07-92-00 Joint Sealants

D. Adhesives
1. Provide adhesive recommended by weather barrier manufacturer
2. Products:
   a. Liquid Nails® LN-109
   b. Polyglaze® SM 5700
   c. Denso Butyl Liquid
   d. 3M High Strength 90
   e. SIA 655
   f. Adhesives recommend by the weather barrier manufacturer

E. Primers
1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

2.4 F. Products
1. 3M High Strength 90
2. Denso Butyl Spray
3. SIA 655
4. Permagrip 105
5. Primers recommended by the flashing manufacturer

B. Self Adhered Flashing:
   1. Grace Perm-A-Barrier, as manufactured by Grace Construction Products: flexible membrane flashing materials for window openings and penetrations.
   2. DuPont™ StraightFlash™, as manufactured by DuPont™ Building Innovations™: straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
   3. Products of “equal” type and performance may be substituted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION- WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

B. Install weather barrier prior to installation of windows and doors.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level

E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Weather Barrier Attachment:
   1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
   2. Attach weather barrier to masonry. Secure using weather barrier manufacturer recommend fasteners, space 6-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site.

H. Overlap weather barrier

1. Exterior corners: minimum 12 inches.
2. Seams: minimum 6 inches

I. Apply 4 inch by 7 inch piece of self adhered flashing to weather barrier membrane prior to the installation cladding anchors

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION

A. Cut weather barrier in a modified “I-cut” pattern
1. Cut weather barrier horizontally along the bottom of the header.
2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
4. Fold side and bottom weather barrier flaps into window opening and fasten.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of opening.

3.5 FLASHING

A. Cut 12-inch wide self adhered flashing a minimum of 12 inches longer than width of sill rough opening.

B. B.Cover horizontal sill by aligning self adhered flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan Grace self adhered flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

E. Install window according to manufacturer’s instructions.

F. Apply 4-inch wide strips of self adhered flashing at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.

G. Apply 4-inch wide strips of self adhered flashing as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both

jamb flashings.

H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide self adhered flashing over the 45-degree seams.

I. Tape head flap in accordance with manufacturer recommendations

J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.06 PROTECTION

A. Protect installed weather barrier from damage throughout time of construction.

B. Tape all torn and damaged areas prior to enclosing the barrier behind the finished surface.

END OF SECTION 07 25 00

SECTION 07 26 16 - BELOW GRADE VAPOR RETARDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Vapor retarders and related accessories installed beneath concrete slabs on-grade.

B. Related Sections include the following:
   1. Division 03 Section "Cast-In-Place Concrete".
   2. Division 31 Sections for porous aggregate and other subgrade materials.

1.3 REFERENCES

A. ASTM D882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

B. ASTM D1709 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

C. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

D. ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls or as Ground Cover.

E. ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

F. ASTM E1745 Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.4 SUBMITTALS

A. Product Data: Submit product data, including manufacturer's data sheet, for specified products.

B. Samples: Submit 8 1/2 inch by 11 inch samples of specified vapor retarder.

C. Quality Control Submittals; Manufacturer's Instructions: Manufacturer's installation instructions.

1.5 DELIVERY, STORAGE & HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Vapor Retarder: 15 mil extruded single-ply or multi-ply type; polyethylene or polyolefin.
   1. Water-Vapor Permeance (ASTM E96 or ASTM E154): 0.01 perms or less.
   2. Class Rating (ASTM E1745): minimum A.
   3. Tensile Strength (ASTM E154 or ASTM D882): 45 lbf./inch or higher.
   4. Puncture resistance (ASTM D1709): 2200 grams or higher.
   5. Thickness: 15 mils minimum.
   6. Acceptable Products:
      a. Raven Industries, Inc.: Vapor Block 15.
      b. Stego Industries, LLC.: Stego Wrap 15-mil Vapor Barrier.
      c. W. R. Meadows, Inc.: Perminator 15 mil Underslab Vapor-Mat.
      d. Fortifiber Building Systems Group, Moistop Ultra 15 mil.
      e. Insulation Solutions, Inc.: Viper Vaporcheck II 15 mil.

B. Pressure-Sensitive Tape/Adhesive: Vapor retarder manufacturer's standard or recommended materials.

C. Pipe Boots: Vapor retarder manufacturer's standard pipe boots, or construct pipe boots from vapor retarder material, pressure-sensitive tape and/or adhesive, in accordance with vapor retarder manufacturer's instructions

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Rake, trim, and tamp surfaces over which vapor retarder is to be installed to true planes and as required to make a surface that will not puncture the vapor retarder material.

3.2 INSTALLATION

A. Install vapor retarder in accordance with manufacturer's printed instructions and ASTM E1643. Lap seams and joints a minimum of 6 inches and seal with adhesive or pressure-sensitive tape.

B. Lap vapor retarder over footings and seal to foundation walls.

C. Seal penetrations, including pipes, with pipe boots.

3.3 PROTECTION

A. Protect vapor retarder as required so that it will be in sound condition, free from punctures and tears, at the time the concrete is placed.

3.4 REPAIR

A. Repair tears and punctures with a piece of vapor retarder material, overlapping the tear or puncture a minimum of six inches on all sides, and completely seal edges with pressure-sensitive tape or adhesive.

END OF SECTION 07 26 16

SECTION 07 31 13 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish and install heavy duty fiberglass mat asphalt shingles as indicated by the Contract Documents.

B. Related Sections include the following:
1. Division 06 Section "Miscellaneous Rough Carpentry".
2. Division 06 Section "Sheathing".
3. Division 07 Section "Flashing and Sheet Metal".

1.3 SUBMITTALS

A. Color samples shall be submitted to the Architect for selection and approval.

B. Product date for roofing nails shall be submitted for approval.

C. Provide all necessary component data in the shop drawings to meet the specified warranty.

1.4 QUALITY ASSURANCE

A. Roof shingle installer shall have a minimum of ten years documented experience in applying Fiber Glass Shingles.

B. Shingles shall bear the Underwriters Laboratories Label.
1. UL Class A Fire Rating - UL 790.
2. Wind Resistant Label UL 997 - 80 MPH Wind Test)

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Shingles shall be stored in a cool, dry space, off the ground on pallets or blocking.

1.6 WARRANTY

A. The Contractor shall guarantee in writing in triplicate that all work included in this section is free of defective workmanship for a period of two years from the date

of substantial completion. Any leaking will be considered as defective workmanship.

1. Each roofing manufacturer has specific support materials and details required to provide the specified warranty. Contractor to utilize all manufacturer's components to achieve specified warranty.
2. Support materials to meet the specified warranty may be located within other sections of this specification and include but are not limited to: sheathing thickness, roof underlayment, roof deck protection, leak barrier and caulks and ridge and hip cap materials and construction.

B. The manufacturer shall furnish a fifty year prorated limited warranty on the shingles.

C. Provide a minimum 110 mile per hour wind warranty or follow the manufacturer's recommendation to meet the requirements of a 50 year shingle roof warranty including all accessories and components.

PART 2 - PRODUCTS

A. Heavy weight (approximately 245 pounds per square) fiberglass mat asphalt shingles, nominal 12 x 36 inch size, having a 5 inch exposure, and 2 inch head lap. Provide algae resistant shingles.
   1. Certainteed: Landmark
   2. Owens Corning Duration
   3. GAF Timberline Prestique 30
   4. Color to be selected.

B. Hip and Ridge Cap shingles: field fabricate from the same color and type of field shingle.

D. Underlayment (Roofliner): Woven polymer core with a top surface of AC copolymer to meet or exceed Class A Fire Rating per ASTM E108 as well as ICC-ES AC-188.

E. Leak Barrier: self sealing, self adhering with film surface and fiberglass reinforcement. Leak barrier is "Straight Flash" and "FlexWrap". Other acceptable manufacturers include:
   1. "StormGuard" as manufactured by GAF Materials Corporation.
   2. "Ice and Water Shield", WR Grace

F. Pipe and penetration flashing: provide preformed thermoplastic rubber collar vent flashing made for the slope of the roof. Set in roofing mastic and seal edges with mastic and cover with shingles following manufacturer's standards.

G. Fasteners: Standard round wire, zinc-coated steel or aluminum; 10 to 12 gage, barbed or deformed shank, with heads 3/8 inch to 7/16 inch in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch or through plywood or oriented strand board by at least 1/8 inch. Staples shall not be used.

H. Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II.

I. Ridge Vent: maximum 1 inch high, Class A fire rated, shingle-over ridge vent. Acceptable products include but are not limited to:
   1. Air Vent Inc. ShingleVent II Class A.

2.2 EXECUTION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Examine surfaces to which shingles are to be applied for uniformity, smoothness, soundness, freedom from dirt and moisture.

C. Verify that all metal flashing work is complete.

D. Verify that work by other trades that penetrate the roof deck has been completed.

E. Once started, the shingle applicator assumes all responsibility for the final condition and appearance of the roof.

2.3 INSTALLATION

A. Comply with manufacturer's written instructions applicable to products and application indicated.

B. Fasten metal drip edge along the eaves before roofing felt is laid and to the rakes after the roofing felt is laid.

D. Lay horizontally one layer Roofliner (2 layers on 4:12 slopes and lower) over the entire roof deck overlapping each course. Overlap 4 inches and 6 inches at side and end joints. Secure with 1” plastic cap nails at 8 inches oc at perimeter and 24” oc in field of the sheet.

E. Concealed, Woven Valley Lining: Comply with NRCA's recommendations. Install a 36-inch-wide felt underlayment centered in valley. Fasten to roof deck with roofing nails.
   1. Lap roof-deck felt underlayment over valley felt underlayment at least 6 inches.
   2. Install a 36-inch-wide strip of granular-surfaced valley lining centered in valley, with granular-surface face up. Lap ends of strips at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Fasten to roof deck with roofing nails.

F. Apply a starter strip of shingles. Starter strip to overhang eaves and rake by 1/2 inch.

G. For shingle applications follow exactly the manufacturers recommendations or requirements of local authorities for the required number of fasteners per square or shingle.

H. Vertical and horizontal joints shall be string straight.

I. Shingles becoming loose or blowing off and showing less than the required number of fasteners per shingle, shall be considered faulty workmanship in respect to the warranty.

J. Intersections of roof surfaces with vertical surfaces shall be flashed, and shall accommodate differential movement. Step flashing shall be secured to the roof deck. Cap flashing shall be secured to the vertical surface. Do not attach step flashing to the cap flashing.

K. Install ridge cap shingles at all hips and ridges.

L. Woven Valleys: Extend succeeding asphalt shingle courses from both sides of valley 12 inches beyond center of valley, weaving intersecting shingle-strip courses over each other. Use one-piece shingle strips without joints in valley.
   1. Do not nail asphalt shingles within 6 inches of valley center.

2.4 VENTILATION

A. General
   1. Ventilation must meet or exceed current F.H.A., H.U.D. and local code requirements.

2.5 CLEAN-UP

A. Clean gutters removing nails, pieces of roofing, or other debris.

B. Pick up nails, pieces of roofing, or other materials that have fallen to the ground.

END OF SECTION 07 31 13

SECTION 07 41 10 - METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Metal Wall Panels and related trim and accessories.

B. Related Sections:
   1. Division 07 Section "Manufactured Copings" for manufactured copings, not part of metal panel assemblies.
   2. Division 07 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.3 DEFINITIONS

A. Metal Panel Assembly: Metal panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight system.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
   1. Include similar Samples of trim and accessories involving color selection.

D. Maintenance Data: For metal panels to include in maintenance manuals.

E. Warranties: Samples of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain each type of metal panels from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal panels from exposure to sunlight and high humidity, except to extent necessary for period of metal panel installation.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit metal panel work to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Verify actual dimensions of construction contiguous with metal panels by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate metal panels with rain drainage work, flashing, trim, and construction of parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
   1. Surface: Smooth, flat finish.
   2. Exposed Coil-Coated Finish: Two coat fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

B. Panel Sealants:
   1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
   2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
   3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 MISCELLANEOUS MATERIALS

A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 METAL WALL PANELS

A. Basis-of-Design Product: the first named manufacturer was used as a basis for design, subject to compliance with requirements, other manufacturers offering comparable products complying with the contract documents will be considered.

1. UnaClad/Firestone panel Delta CFP16F minimum 0.032 inch thick aluminum.
2. Petersen Aluminum Company, Precision Series 16” OC 0.032 inch thick aluminum.
3. Englert panel Series H-12-3 minimum 0.032 inch thick aluminum

2.4 ACCESSORIES

A. Panel Accessories: Provide components approved by panel manufacturer and as required for a complete metal panel assembly including trim, fascia, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

B. Flashing and Trim: Formed from same material as panels, prepainted with coil coating,. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fascia, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

B. Examine primary and secondary framing to verify that panel support members and anchorages have been installed within alignment tolerances required by metal panel manufacturer.

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

3.2 PREPARATION

A. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous panel support members and anchorage according to metal panel manufacturer's written instructions.

3.3 METAL WALL PANEL INSTALLATION

A. Install panels, trim and related accessories in accordance with dimensions and procedures shown on approved shop and erection drawings.

B. The wall systems contractor shall remove all protective materials and labels from the panel system as the panels are installed.

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 41 10

SECTION 074113 - METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Standing-seam metal roof panels.

B. Related Sections:
   1. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal roof panels.
   2. Division 07 Section "Sheet Metal Flashing and Trim" for field-formed fasciae, copings, flashings, roof drainage systems, and other sheet metal work not part of metal roof panel assemblies.
   3. Division 07 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.3 DEFINITIONS

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight roofing system.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Design metal roof panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Water Penetration: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
   1. Test-Pressure Difference: 2.86 lbf/sq. ft..
   2. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
   3. Negative Preload Test-Pressure Difference: 50 percent of design wind-uplift-pressure difference.

D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
   1. Uplift Rating: UL 90.

E. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of roof panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
   1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
      a. Flashing and trim.
      b. Gutters.
      c. Snow guards.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
   1. Metal Roof Panels: 12 inches long by actual panel width. Include fasteners, clips, closures, and other metal roof panel accessories.
   2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
   3. Accessories: 12-inch- long Samples for each type of accessory.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Source Limitations: Obtain each type of metal roof panels from single source from single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.

B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit metal roof panel work to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

B. Coordinate metal roof panels with rain drainage work, flashing, trim, and construction of decks, purlins and rafters, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
   2. Surface: Smooth, flat finish.
   3. Exposed Coil-Coated Finish: AAMA 621, Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 UNDERLAYMENT MATERIALS

A. Felts: ASTM D 226, Type I (No. 15), asphalt-saturated organic felts.

2.3 MISCELLANEOUS MATERIALS

A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal roof panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.4 STANDING-SEAM METAL ROOF PANELS

A. Roof panel type, width will be 16” oc and color is to be selected by the architect from the manufacturer’s full range of color options during the shop drawing review of the roof panels.

B. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
   1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

C. Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and snapping panels together.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Petersen Aluminum Corporation - Tite-Loc Panel.
      b. Englert, Inc.
      c. CENTRIA Architectural Systems.
      d. Integris Metals.

e. McElroy Metal, Inc.
f. Metal Sales Manufacturing Corporation.

2. Material: 24 gage, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
3. Panel Coverage: 18” with a maximum of 24”.
4. Panel Height: seam height nominal 2”.

2.5 ACCESSORIES

A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

B. Flashing and Trim: Formed from same material as roof panels, prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

C. Gutters: Formed from same material roof panels. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match roof fascia and trim.

2.6 SNOW GUARDS

A. Snow Guards: Prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring.
1. Surface-Mounted, Plastic, Stop-Type Snow Guards: Clear polycarbonate with UV stabilizers, stops designed for attachment to pan surface of metal roof panels using construction adhesive, silicone or polyurethane sealant, or adhesive tape. Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Sno-Gem; Sno-Gem
b. Snojax Inc.; SNOJAX

2.7 FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weathertight and minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.

B. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

C. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

D. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

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

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

B. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

1. Soffit Framing: Wire tie furring channels to supports as required to comply with requirements for assemblies indicated.

3.3 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Apply over entire roof surface, in shingle fashion to shed water, and with lapped joints of not less than 2 inches.

B. Install flashings to cover underlayment to comply with requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."

3.4 METAL ROOF PANEL INSTALLATION, GENERAL

A. Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

B. Thermal Movement. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Predrill panels for fasteners.
1. Point of Fixity: Fasten each panel along a single line of fixing located at eave.
2. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

C. Install metal roof panels as follows:
1. Field cutting of metal panels by torch is not permitted.
2. Locate and space fastenings in uniform vertical and horizontal alignment.
3. Provide metal closures at ends and edges of panels.
4. Flash and seal metal roof panels with weather closures at eaves, rakes, and perimeter of all openings.
5. Install metal flashing to allow moisture to run over and off metal roof panels.

D. Fasteners:

1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized-steel fasteners for surfaces exposed to the interior.

E. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

F. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
   1. Coat back side of roof panels with bituminous coating where roof panels will contact wood, ferrous metal, or cementitious construction.

G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.
   1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.
   2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. Standing-Seam Metal Roof Panels: Fasten metal roof panels to substrate with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.
   1. Install clips to supports with self-tapping fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

3.6 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line

and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.7 SNOW GUARD INSTALLATION

A. Stop-Type Snow Guards: Attach snow guards to metal roof panels with adhesive, sealant, or adhesive tape, as recommended by manufacturer. Do not use fasteners that will penetrate metal roof panels.

1. Provide two (2) rows of snow guards, two per roof panel, at locations to be determined.

3.8 FIELD QUALITY CONTROL

A. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

B. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 41 13

SECTION 07 42 16 – INSULATED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Pre-insulated architectural metal panel cladding where indicated on the drawings. Also included are all necessary trims, fasteners, sealants and gaskets as required for a weathertight installation. Panels shall be secured to the structure with concealed clips and fasteners in the side joints.

1. Steel faced factory foamed-in-place flat panels with integral reveals with compatible joinery. Panels shall be designed to permit installation in either vertical or horizontal orientations.
2. Extruded aluminum trim related to the walls and its intersection with adjacent materials.
3. Sealants and gaskets between panels and their intersection.

1.3 RELATED SECTIONS

1. Division 07 Section "Manufactured Copings" for manufactured copings, not part of metal panel assemblies.
2. Division 07 Section "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

1.4 REFERENCES

A. AAMA 501.1 – Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure.

B. ASTM A 653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

C. ASTM A 792 – Standard Specification for Steel Sheet, Aluminum-Zinc Alloy Coated Steel by the Hot-Dip Process.

D. ASTM C 518 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

E. ASTM E 72 – Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

F. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

G. ASTM E 283 – Standard Method for Determining the Rate of Air Leakage Through Exterior Window, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

H. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Wall by Uniform Static Air Pressure Difference.

I. CAN/ULC S102 – Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.5 PERFORMANCE REQUIREMENTS

A. Structural Tests: The design load/deflection criteria shall be verified from tests per ASTM E 72 “Air Bag Method” using a 20 psf (.96 kPa) simulated wind load. A deflection limit of L/180 shall apply to wall panel.

B. Thermal Transmission: Testing in accordance with ASTM C 518, “measurement of steady state thermal transmission", the panels shall provide a K-factor of .140 btu/sf/hr/deg. F at 75º F (24º C) mean temperature (air films are not included).

C. Vapor Barrier
1. Air Infiltration: Air infiltration shall not exceed .06 cfm per square foot of wall area when tested per ASTM E 283 at a static pressure of 12.0 psf (.576 kPa).
2. Static Water Penetration: There shall be no uncontrolled water penetration through the panel joints at a static pressure of 20.0 psf (.96 kPa) when tested per ASTM E 331.
3. Dynamic Water Penetration: There shall be no uncontrolled water penetration through the panel joints when subjected to a 95 mph (153 kph) slipstream airflow and application of water for a 15 minute period in accordance with AAMA 501.1.

D. Fire
1. Surface Burning Characteristics: The insulated core shall have been tested in accordance with ASTM E 84 and CAN/ULC S102 for surface burning characteristics. The core shall have a maximum flame spread of 25 and a maximum smoke developed rating of 450.
2. Factory Mutual Research Corporation (FMRC) Standard 4880, 50’ (15.24 m) High Corner Test for Unlimited Height Structures: The panel assembly shall not support a self-propagating fire which reaches any of the limits of the 50’(15.24 m) high corner test structure as evidenced by flaming or material damage of the ceiling of the assembly. Note: Approval is applicable to structures of unlimited height.
3. Factory Mutual Research Corporation (FMRC) Standard 4881, Standard for Class 1 Exterior Wall Systems.

E. Bond Strength
1. Fatigue Test: The panel shall withstand deflection cycling at L/180 to two (2) million alternate cycles with no evidence of delamination, core cracking or permanent bowing.

2. Freeze/Heat Cycling: The panel shall exhibit no delamination, surface blistering or permanent bowing when subjected to cyclic temperature extremes of –20º F (-28º C) to +180º F (+82º C) for twenty-one (21) eight hour cycles.
3. Humidity Test: The panel shall exhibit no delamination or metal corrosion at interface when subjected to a +140º F (+60º C) temperature and 100% relative humidity for a total of 1200 hours.
4. Autoclave Test: The panel shall exhibit no delamination of the foam core from metal skins when exposed to 2 psi (.122 kg/sq. cm) pressure at a temperature of +212º F (+100º C) for a total of 2½ hours.

F. State of Florida Building Code Product Approved Panel System.

G. System shall be Large Missile Impact tested and approved by Miami-Dade per the following tests: TAS 201-94, 202-94, 203-94.

1.6 DEFINITIONS

A. Insulated Metal Panel Assembly: Metal panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight system.

1.7 SUBMITTALS

A. Submit under provisions of Section 01 33 00.
B. Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Material type, metal thickness and finish.
   4. Installation methods.
C. Shop Drawings: Including elevations, fastening patterns, sections of each condition and details as required.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Panel Sample: Submit 1' (305 mm) high by full width sample panel for each profile specified indicating the metal, texture and finish.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.8 QUALITY ASSURANCE

1. Manufacturer Qualifications: Company specializing in manufacturing factory fabricated metal panels with a minimum documented experience of ten (10) years.
2. Installer Qualifications: Company specializing in installation of the products specified for projects of similar size and scope with minimum five (5) years documented experience.
3. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the project is located and who is experienced in providing engineering services of kind indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal panels from exposure to sunlight and high humidity, except to extent necessary for period of metal panel installation.

1.10 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit metal panel work to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Verify actual dimensions of construction contiguous with metal panels by field measurements before fabrication.

1.11 COORDINATION

A. Coordinate metal panels with rain drainage work, flashing, trim, and construction of parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Project warranty refers to Conditions of the Contract for project warranty provisions. Manufacturer’s warranty: submit, for Owner’s acceptance, manufacturer’s standard warranty documents executed by authorized company official. Manufacturer’s warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.

B. The Contractor shall warrant the materials to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be extended by paint manufacturer's standard multi-year warranty. The warranty shall be in writing and shall be signed by the manufacturer.
C. Materials Manufacturers: Repair or replace defective materials for a period of two (2) years.
D. Panel System Installer: Repair or replace products or components which fail due to faulty workmanship for a period of two (2) years.
E. Painted Finish: Coatings Manufacturer and applicator to warrant paint for a period of twenty (20) years after the Effective Date, the factory applied finish applied by the applicator.
   a) WILL NOT chip, crack or peel (lose adhesion) but does not include minute fracturing which may occur in proper fabrication of building parts.
   b) WILL NOT chalk in excess of ASTM D-4214-89 number eight (8) rating, determined by the procedure outlined in ASTM D-4214-89 specification test.
   c) WILL NOT change color more than five (5) Delta-E Hunter units (square roof of the sum of square Delta L, Delta a, and Delta b) as determined by ASTM method D-2244. It is acknowledged that fading or color changes may not be uniform if the surfaces are not equally exposed to the sum and elements. No warranty is offered for the interior painted surface of the panel.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: Subject to compliance with requirements, provide products manufactured by:
   1. Firestone Building Products: UNA-FOAM – Flat Insulated Architectural Metal Wall Panel System

B. Other Acceptable Manufacturers Include:
   1. Petersen Pac Clad (system to match specified; submit during shop drawing phase)
   2. Centria (system to match specified; submit during shop drawing phase)
   3. Englert (system to match specified; submit during shop drawing phase)

2.2 PANEL DESIGN

A. Panel – General Requirements: Firestone Metal Products Flat Insulated Architectural Metal Wall Panel - Roll-formed exterior and interior steel sheet faces chemically bonded to continuously foamed-in-place polyurethane core; laminated panels are not acceptable.
   1. Exterior Face: G-90 galvanized stucco embossed painted steel, minimum Grade 33 and/or AZ-50 Aluminum-Zinc stucco embossed painted steel, minimum Grade 33 in 22ga (0.0312").
   2. Interior Face: G-90 galvanized unembossed painted steel, minimum Grade 33 and/or AZ-50 Aluminum-Zinc unembossed painted steel,

minimum Grade 33 in 26ga (0.0187”), 24ga (0.0250”) & 22ga (0.0312”) unless otherwise indicated.

3. Longitudinal Joint Sealants: Field applied.
4. Foam Core: Non-CFC, Class I, polyurethane.
5. Exterior Finish: Exterior face sheet shall be treated with a nominal 0.2 mil (5 microns) base primer, followed by a nominal 0.7 mil (17.5 microns) finish coat of full strength PVF2 fluoropolymer in manufacturer’s standard colors.
   Note: Thick mil coatings for aggressive environments are available at extra cost. Siliconized Polyester is also available. Consult the factory for complete information.
6. Interior Finish: The interior face sheet shall be a nominal 0.2 mil (5 microns) primer followed by a nominal 0.7 mil (17.5 microns) polyester coating in USDA compliant Igloo White.

B. Flat Architectural Metal Wall Panel: Concealed fastener wall panels with offset double tongue and groove joinery and an extended metal shelf allowing fasteners to penetrate both metal faces with clips concealed in the side joint.
   1. Exterior Face Profile: Flat, stucco embossed.
   2. Interior Face Profile: Light Sonora Pattern, 1/16" deep
   3. Module Width: 24”, 30” or 36” in horizontal or vertical application.
   4. Thickness: 2”, 2.5”, 3” or 4”.
   5. Joint Reveal Options: ¼”, ½”, ¾”, 1”, 1½”, 2”, 2½”, or 3” horizontal joint reveal.
   6. Trimless ends provided at panel ends if required.

C. Foam core shall be continuously foamed-in-place, Non-CFC polyurethane.

D. Flashing and trim shall be brake-formed sheet metal in the same thickness and finish to match the panels.

E. Manufacturer’s standard extruded aluminum trim painted to match the panel is available

F. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

B. Examine primary and secondary framing to verify that panel support members and anchorages have been installed within alignment tolerances required by metal panel manufacturer.

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

3.2 PREPARATION

A. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous panel support members and anchorage according to metal panel manufacturer's written instructions.

3.3 METAL WALL PANEL INSTALLATION

A. Install in accordance with manufacturer’s instructions and recommendations including approved shop drawings, installation guidebook and manufacturer’s handbook of construction details.

B. Install panel as indicated on drawings, accurate in size, square, and free from distortion or defects.

C. Install flashing and trim true and in proper alignment.

D. Install sealants where indicated to clean dry surfaces only without skips or voids, to ensure weather tightness and integrity of the vapor barrier.

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant

and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 16

SECTION 07 53 23 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Adhered, 60 mil White, non-reinforced, EPDM membrane roofing system.
   2. Roof insulation.
   3. Cover board.

B. Related Sections include the following:
   1. Division 05 Section "Steel Decking" for furnishing roof deck.
   2. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   3. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
   4. Division 07 Section "Joint Sealants."

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
   1. Fire/Windstorm Classification: Class 1A-60.

1.5 SUBMITTALS

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

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Insulation fastening patterns.

C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

D. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of meeting performance requirements.

E. Qualification Data: For Installer and manufacturer.

F. Maintenance Data: For roofing system to include in maintenance manuals.

G. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Manufacturer Qualifications: A qualified manufacturer that has UL listing FMG approval for membrane roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E548.

D. Source Limitations: Obtain components for membrane roofing system as manufactured or approved by roofing membrane manufacturer.

E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
   1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.

2. Fire-Resistance Ratings: ASTM E119, for fire-resistance-rated roof assemblies of which roofing system is a part. Comply with UL Design numbers listed on drawings.

F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
1. Meet with Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
   1. Special warranty includes roofing membrane, base flashings, and other components of membrane roofing system.
   2. Warranty Period: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other PART 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
   2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 EPDM ROOFING MEMBRANE

A. EPDM Roofing Membrane: ASTM D4637, Type I, nonreinforced uniform, flexible sheet made from EPDM, and as follows:
   1. Available Manufacturers include:
      a. Firestone Building Products, EcoWhite EPDM
      b. Carlisle SynTec Incorporated; Sure White.
      c. Versico; VersiGard White EPDM
   2. Thickness: 60 mils, nominal.
   3. Exposed Face Color: White

2.3 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: 45-mil- thick EPDM; color to match field, partially cured or cured, according to application and manufacturer's recommendations.

C. Bonding Adhesive: Manufacturer's standard bonding adhesive.

D. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 3-inch- wide minimum, butyl splice tape with release film.

E. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.

F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

G. Metal Termination Bars: predrilled stainless-steel bars, approximately 1 by 1/8 inch thick; with anchors.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

I. Miscellaneous Accessories: Provide preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.4 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes. Provide two (2) layers, 1-1/2 inches thick each, total thickness 3 inches, plus tapered insulation.

B. Minimum thickness to span deck flute is 1 inch, Type B deck is 2-1/2 span.

C. Polyisocyanurate Board Insulation: ASTM C1289, Type II, felt or glass-fiber mat facer on both major surfaces. Reference item E below.
   1. Available Manufacturers:
      a. Firestone Building Products Company.
      b. Carlisle SynTec Incorporated.
      c. Celotex Corporation.
      d. RMAX.

D. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated.

E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

F. Cover board: 1/2 inch thick utilizing the manufacturer’s recommendation or Dens-Deck. Where available, a composite board consisting of insulation and cover board may be used.

2.5 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.6 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall notify the Architect minimum, 48 hours prior to start of insulation installation to allow the Architect the opportunity to observe and examine the completed roof deck prior to installation of insulation.
   1. Correct all errors, deficiencies and non-conforming work noted, prior to installing insulation.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thickness of insulation.
   3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
   4. Proceed with installation only after errors, deficiencies, non-conforming work and other unsatisfactory conditions have been corrected.
   5. Start of installation indicates acceptance of the substrate conditions by the roofing installer.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in both directions. Install cover board over insulation with joints staggered from insulation.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
   1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
   1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.

3.4 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

F. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

G. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

H. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

3.5 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.6 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

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

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
   1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07 53 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Flashing, Counterflashing and Sheet Metal.
   2. Stainless steel cavity closures.
   3. Gutters and downspouts.

B. Related Sections include the following:
   1. Division 04 - Unit Masonry, for concealed flashings.
   2. Division 07 – EPDM Roofing
   3. Division 07 - Manufactured Copings.
   4. Division 07 - Manufactured Gravel Stops and Fascias.
   5. Division 07 - Joint Sealants.

1.3 SUBMITTALS

A. Product Data: For each type of roof hatch indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples; Flashing, Sheet Metal, Accessories: Submit 8 inch square samples of specified sheet materials to be exposed as finished surfaces. Submit full size samples, minimum of 2 feet wide, of each fascia and coping section for review by the Architect prior to installation.

C. Shop drawings shall be coordinated with other building cladding products to accurately indicate substrate conditions and materials, the correct interface conditions at adjoining cladding systems, accurate details of the adjoining cladding components, interface flashings and or cavity closures. Provide isometrics to clearly indicate required construction sequencing. Provide layouts at 1/4 inch scale, details at 3 inch scale.

D. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIEMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.4 PERFORMANCE REQUIREMENTS

A. General: Manufacture and install manufactured roof edgings to resist thermally

induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

B. Water Infiltration: Provide manufactured roof edgings that do not allow water infiltration to building interior.

1.5 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship materials properly labeled in heavy-duty packaging to prevent damage.

B. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

C. Store materials off ground, under cover. Protect from damage and deterioration.

D. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Reject and remove damaged material from site.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

B. Coordinate layout and installation with adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

1.9 WARRANTY

A. Furnish written guarantee, countersigned by contractor and installing subcontractor, that work is unconditionally guaranteed to be watertight and free of defects and faulty workmanship for a period of two years from date of completion of the work.

B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum: ASTM B209, alloy 3003, temper H14. Provide pre-finished Kynar 500/Hylar 5000 finish. Colors to be selected from manufacturer's full color selection, excluding metallic colors.
   1. Gutters up to 15 inch girth; use minimum 0.032 inch thickness.
   2. Gutters 15+ - 20 inch girth; use minimum 0.040 inch thickness.
   3. Gutters 20+ - 25 inch girth, use minimum 0.050 inch thickness.
   4. Gutters: over 25 to 30 inch girth; use minimum 0.063 inch thickness.
   5. Downspouts: use minimum 0.032 inch thickness.
   6. Scuppers: use minimum 0.040 inch thickness.
   7. Flashing: use minimum 0.050 inch thickness.
   8. Counterflashing: use minimum 0.040 inch thickness.
   9. Fascia: use minimum 0.050 inch thickness.

B. Stainless Steel Sheet: ASTM A240 or ASTM A666, Type 304, dead soft, fully annealed.
   1. Finish: 2D (dull, cold rolled).
   2. Surface: Smooth, flat.
   3. Thickness:
      a. Concealed (cavity closure): 0.012 inches minimum.
      b. Exposed (receiver): 0.015 inches minimum.

C. Fasteners: Same metal as flashing/sheet metal or compatible with flashing sheet metal. Where exposed, match finish of exposed heads with material being fastened.

D. Elastomeric Sealant: ASTM C920, elastomeric medium modulus neutral cure silicone sealant to seal joints in sheet metal flashing and trim and remain watertight.
   1. Dow Corning 795 Building Sealant, or approved substitute.

E. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.

F. Reglets: Metal, compatible with flashing indicated, non- corrosive.

G. Metal accessories: Provide sheet metal clips, straps, anchoring devices and all accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive.

H. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates, with bituminous coating or other permanent separation.

2.2 METAL FINISHES

A. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capabilities. Protect coating either by application of strippable film or by packing plastic film or other suitable material between panels in a manner to properly protect the finish. Furnish air-drying spray finish in matching color for touch-up.

B. Fluoropolymer Coating: Manufacturer's standard two-coat, thermocured, full-strength 70 percent "Kynar 500" coating consisting of a primer and a minimum 0.75-mil dry film thickness with a total dry film thickness of 0.9 mil.

C. Durability: Provide coating that has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 in accordance with ASTM D659; and without fading in excess of 5 NBS units.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
   1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive sheet metal work.
   2. Verify dimensions.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual". Anchor units as required to be secure and permanently watertight/weathertight.

B. Provide for thermal expansion of all exposed sheet metal and flashing work exceeding 15 feet running length.

C. Provide a concealed interlocking splice plate minimum 6 inch long and full splice depth of flashing at all joints. Bed exposed flashing in DOW 795 medium modulus

silicone at each side of plate.

D. Locate joints at least 2 feet from corners and intersections.

E. Conceal fasteners and expansion provisions wherever possible. Fold back edges on concealed side of exposed edges to form a hem. If fasteners cannot be concealed they must match the color of the sheet metal.

F. Insert flashing into reglet as shown. Anchor by mechanical means, including driven wedges of lead or other compatible metal, spaced 24 inches on center, maximum. Seal joint with sealant as indicated.

3.3 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 62 00

SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following manufactured roof specialties:
   1. Copings.

B. Related Sections include the following:
   1. Division 06 - " Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Division 07 - "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
   3. Division 07 - "Roof Accessories" for roof hatches.
   4. Division 07 - "Joint Sealants" for field-applied sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal Movements: Provide manufactured roof specialties that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

C. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work. Include the following:

1. Details for fastening, joining, supporting, and anchoring manufactured roof specialties including fasteners, clips, cleats, and attachments to adjoining work.
2. Details for expansion and contraction.

C. Samples for Initial Selection: For each type of manufactured roof specialty indicated with factory-applied color finishes.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings with performance requirements.

1.5 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.6 COORDINATION

A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.7 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 10 years from date of Substantial Completion.

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, manufacturers listed in other Part 2 articles.

2.2 EXPOSED METALS

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and finish indicated, finished as follows:
   1. Surface: Smooth, flat finish.
   2. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

2.3 CONCEALED METALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
   1. Exposed Penetrating Fasteners (if required): Gasketed screws with hex washer heads matching color of sheet metal.

C. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

E. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
   1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft..

2.5 COPINGS

A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as coping caps, mitered and welded corner units, and end cap units.
   1. Available Products:
      a. Metal-Era (Perma-Tite Coping)
      b. MM Systems (Snap-Lock Coping)
      c. Hickman (Modular Coping)
   2. Coping Caps: Snap-on, fabricated from minimum 24 gage galvanized steel.
   3. Coping Cap Color: custom color Kynar 500/Hylar 5000 finish, color to match PPG Duranar Sunstorm Champagne Bronze.
   4. Corners: Continuously welded.
   5. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches wide, nominal 0.028 inch thick, with integral cleats.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
   1. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners,

separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.

1. Install manufactured roof specialties with provisions for thermal and structural movement.
2. Torch cutting of manufactured roof specialties is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum manufactured roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing exposed-to-view components of manufactured roof specialties directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.

C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.

D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.

F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

G. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties.

3.3 COPING INSTALLATION

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings to resist uplift and outward forces according to performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's recommended spacing.

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished

surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

B. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 72 33 - ROOF HATCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Roof hatches.
   2. Ladder safety post.

B. Related Sections include the following:
   1. Division 05 Section "Metal Fabrications" for metal vertical ladders, and stairs for access to roof hatches.
   2. Division 07 low-slope roofing Sections for roofing accessories.

1.3 SUBMITTALS

A. Product Data: For each type of roof hatch indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1.4 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate layout and installation of roof hatches and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

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, manufacturers listed in other Part 2 articles.

2.2 ROOF HATCHES

A. Roof Hatches: Fabricate roof hatches with insulated double-wall lids and insulated single-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded or mechanically fastened and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.
   1. Available Manufacturers: refer to drawings for size and location.
      a. Bilco Company (The) Model S (minimum size).
      b. J. L. Industries, Inc. Model RHG-1(minimum size)..
      c. Milcor Inc.; a Gibraltar Company Model M-1(minimum size)..
   3. Curb and Lid Material: Galvanized or Aluminum-zinc alloy-coated steel sheet, minimum 14 gage.
      a. Finish: manufacturer’s standard primer.
   4. Insulation: Polyisocyanurate board.
   5. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid, (minimum 22 gage).
   6. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
   7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate hatch curbs with height tapered to match slope to level tops of units.
   8. Hardware: Galvanized steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.

B. Ladder Safety Post: telescoping, spring balanced tube steel post with baked enamel finish. Post to lock in place on full extension. Provide release mechanism to return post to closed position. Provide mounting to center of ladder rungs.
   1. Available Manufacturers:
      a. Bilco Company - LadderUP Safety Post.
      b. J.L. Industries - LP-4 Safety Post
      c. Maxam Metal Products - SLP-1

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
   1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
   2. Verify dimensions of roof openings for roof accessories.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Install roof accessories to fit substrates and to result in watertight performance.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

D. Roof Hatch Installation:
   1. Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
   2. Attach ladder safety post according to manufacturer's written instructions.

E. Seal joints with sealant as required by manufacturer of roof accessories.

3.3 TOUCH UP

A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 09 painting Sections.

3.4 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 72 33

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Penetrations in fire-resistance-rated walls.
   2. Penetrations in horizontal assemblies.
   3. Firewalls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
      a. 1) Be located in accessible concealed floor, floor-ceiling or attic spaces;
      b. 2) Be located within 15 feet of each end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition; and
      c. 3) Include lettering not less than 3 inches in height with a minimum 3/8 inch stroke in a contrasting color, incorporating the suggested wording: “FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS,” or other wording.

1.3 SUBMITTALS

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

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
   1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Qualification Data: For qualified Installer.

D. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
   1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
   2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
      a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
      b. Classification markings on penetration firestopping correspond to designations listed by the following:
         1) UL in its "Fire Resistance Directory."

B. Preinstallation Conference: Conduct conference at Project site and provide no less than 2 weeks notice to all those required for attendance. Invitees shall include but not be limited to: Architect, Owner’s Representative, General Contractor, Sub Contractors performing adjacent work and the sub-contractor performing the work..

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Hilti, Inc.
   2. 3M Fire Protection Products.
   3. Tremco, Inc.; Tremco Fire Protection Systems Group.

4. Grace Construction Products.
5. Johns Manville.
6. Nelson Firestop Products.
7. RectorSeal Corporation.
8. USG Corporation.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
   1. Fire-resistance-rated walls include fire walls and fire partitions.
   2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
   1. Horizontal assemblies include floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
   2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
   3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

E. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
   1. Permanent forming/damming/backing materials, including the following:
      a. Slag-wool-fiber or rock-wool-fiber insulation.
      b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.

c. Fire-rated form board.
d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

D. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

E. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

F. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

G. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
   1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Manufacturer's name.
   6. Installer's name.

B. Identification of firewalls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling and shall meet the three following requirements:
   1. Be located in accessible concealed floor, floor-ceiling or attic spaces;
   2. Be repeated at intervals not exceeding 30 feet measured horizontally along the wall or partition; and
   3. Include lettering not less than 0.5 inch in height, incorporating the suggested wording: “FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS,” or other wording.

3.5 FIELD QUALITY CONTROL

A. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

B. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 84 56 - FIRE SAFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following;
   1. Head wall firestop systems for fire-resistance-rated constructions.
   2. Joints in or between fire-resistance-rated constructions.
   3. Joints at exterior curtain-wall/floor intersections.
   4. Joints in smoke barriers.

B. Related Sections include the following:
   1. Division 21 Sections specifying fire-suppression piping penetrations.
   2. Division 22 and 23 Sections specifying duct and piping penetrations.
   3. Division 26, 27, and 28 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

A. General: For top of wall, at vertical and horizontal joints and at wall/ floor intersections of dissimilar materials fire-resistance-rated constructions, that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction.

1.4 SUBMITTALS

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

B. Product Test Reports: From a qualified testing agency indicating system complies with requirements, based on comprehensive testing of current products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver fire safing products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fire Safing: mineral fiber insulation, both shaped to fit metal deck flutes and standard batts. Subject to compliance with requirements, materials that may be incorporated into the Work include, but are not limited to,:
   1. Thermafiber Inc. TopStop and SAFB (Sound Attenuation Fire Blankets).

B. Sealants used in combination with other materials to provide rated construction in conformance with U.L. construction indicated on the drawings. Subject to compliance with requirements, materials that may be incorporated into the Work include, but are not limited to,:
   1. Thermafiber Inc. Smoke Seal Compound.

C. Accessories: Provide Zee clips for support of safing insulation and other accessory items required for compliance with UL construction details.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

3.3 PROTECTION

A. Provide final protection and maintain conditions during and after installation that ensure that systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, remove damaged or deteriorated systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 56

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes joint sealants as scheduled below.

B. Related Sections include the following;
   1. Section 07 84 13 - Penetration Firestopping, for sealants used at expansion and control joints in fire and smoke rated construction.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.
   1. Include Volatile Organic Compound information for material, adhesive and sealants.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. BASF Building Products, Sonneborn.
   2. Dow Corning Corporation.
   3. GE Advanced Materials.
   4. Pecora Corporation.
   5. Sika Corporation, Construction Products Division.
   6. Tremco Incorporated

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Volatile Organic Compounds found in adhesives and sealants may not exceed the following:
   1. Architectural: 250 g/L less water
   2. Architectural Porous: 775 g/L less water
   3. Nonmembrane Roof 300 g/L less water
   4. Single Ply Roof Membrane 450 g/L less water
   5. Other 750 g/L less water

C. Extreme Movement Sealants (+100% or -50% movement capability)
   1. Vertical/horizontal joint, such as expansion joints; use reference #S-6.

D. Significant Movement Sealants (+25% or -25% movement capability)
   1. Vertical or inclined joints such as panel, coping, expansion, and sloped pavement; use reference #S-1, 3 or 6.
   2. Horizontal joints not exposed to fuel or gas spillage; use reference #S-1, 2, 3, 4, 6 or 7.

E. Minimal Movement Sealants (+25% or -25% movement capability)

1. Vertical or inclined joints such as perimeters of doors, windows, wall penetrations; use reference #S-1, 3, 4, or 6.
2. Horizontal joints not exposed to fuel or gas spillage; use reference #S-2, or 5.

F. Interior Sealants and Caulking
1. General; use reference #C-1.
2. Special: Toilet rooms; use reference #S-8.

2.3 REFERENCE NUMBERS

REF #	ASTM SPEC	PRODUCT DESCRIPTION (minimum requirements)
S = Sealant		
S-1	C-920 Type M Class 25 Grade NS	Multi component, non-sag polyurethane or polysulfide sealant Shore A hardness of 20-40 Joint Movement range of ±25%
S-2	C-920 Type M Class 25 Grade P	Multi component, self-leveling polyurethane or polysulfide sealant Shore A hardness of 25-40 Joint Movement range of ±25%
S-3	C-920 Type S Class 50 Grade NS	Low modulus one component, non-sag polyurethane or polysulfide sealant Shore A hardness of 15-25 Joint Movement range of ±50% Minimum Elongation of 700%
S-4	C-920 Type S Class 25 Grade NS	One component, non-sag polyurethane or polysulfide sealant Shore A hardness of 25-40 Joint Movement range of ±25%
S-5	C-920 Type S Class 25 Grade P	One component, self-leveling polyurethane or polysulfide sealant Shore A hardness of 15-45 Joint Movement range of ±25%
S-6	C-920 Type S Class 100/50 Grade NS	Low modulus one component, non-sag neutral cure, silicone sealant Shore A hardness of 15-20 Joint Movement range of +100% to -50%
S-7	C-920 Type S Class 25 Grade NS	One component, neutral cure, non-sag, silicone sealant Shore A hardness of 25-30 Joint Movement range of ±25%
S-8	C-920 Type S Class 25 Grade NS	One component, non-sag, mildew resistant silicone sealant Shore A hardness of 25-30
C = Caulk		
C-1	C834	One component acrylic latex caulking Minimum 75% recovery per ASTM C736 Maximum joint movement of ±7.5%

2.4 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.5 LATEX JOINT SEALANTS

A. Latex Sealant: Comply with ASTM C834, Type P, Grade NF.

2.6 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834 and the following:
   1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

2.7 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
      a. Concrete.
      b. Masonry.
   3. Remove laitance and form-release agents from concrete.
   4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include but are not limited to the following:
      a. Metal.

b. Glass.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.

2. Provide concave joint configuration unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Standard hollow metal doors and frames.
2. Custom hollow metal doors and frames.
3. Provide frames with unequal legs where indicated on drawings.
4. Provide doors and frames capable of receiving 1 inch insulating glass units and 1/4 inch glazing, where indicated on the drawings.

B. Related Sections:
1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
3. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:
1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.

8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those in the Contract Documents. Coordinate with door hardware schedule.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C.

C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.

D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.
1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Amweld Building Products, LLC.
   2. Ceco Door Products; an Assa Abloy Group company.
   3. Curries Company; an Assa Abloy Group company.
   4. Mesker Door Inc.
   5. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B; with minimum A40 metallic coating.

D. Frame Anchors: ASTM A591, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A1008 or ASTM A1011, hot-dip galvanized according to ASTM A153, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C476, except with a maximum slump of 4 inches, as measured according to ASTM C 143.

H. Mineral-Fiber Insulation: ASTM C665, Type I and III (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 4- to 6 lb/cu.ft. density; with maximum flame-spread and smoke-development indexes

of 25 and 50, respectively; passing ASTM E136 for combustion characteristics. Acceptable products include;
1. Thermafiber Inc. - Safing Insulation.
2. Fibrex Insulations, Inc. - Safing Insulation.

I. Glazing: Comply with requirements in Division 08 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities. Do not use at fire rated locations.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C1363.
1) Locations: Exterior doors.
2) Do not provide polyurethane material at rated conditions
3. Vertical Edges for Single-Acting Doors: Beveled edge, 1/8 inch in 2 inches.
4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets. Provide flush top edge at exterior doors.
5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from 0.067-inch- thick, metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

2. Level 2 and Physical Performance Level B (Heavy Duty), Seamless.
a. Width: 1 ¾” thick 18 gage faces As indicated on Drawings

C. Interior Doors: Face sheets fabricated from 0.067-inch- thick, cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

2. Level 1 and Physical Performance Level C (Standard Duty), [

a. Width: 1-3/4 inches 20 gage faces As indicated on Drawings.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

F. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames:
0.093-inch- thick steel sheet.

4. Hot-dip galvanize exterior frames after fabrication.

C. Interior Frames: Fabricated from cold-rolled steel sheet.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames:

4. Frames for Wood Doors: 0.067-inch- thick steel sheet.
5. Frames for Borrowed Lights: 0.042-inch- thick steel sheet.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.7 FRAME ANCHORS

A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners. Weld to frame after adjustment.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.8 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.9 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.10 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:
   1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Provide welded flush top closure channel. Seal joints in top edges of doors against water penetration.
   2. Glazed Lites: Factory cut openings in doors.
   3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
   2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
   3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Two anchors per jamb up to 60 inches high.
      2) Three anchors per jamb from 60 to 90 inches high.
      3) Four anchors per jamb from 90 to 120 inches high.
      4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
   b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Three anchors per jamb up to 60 inches high.
      2) Four anchors per jamb from 60 to 90 inches high.
      3) Five anchors per jamb from 90 to 96 inches high.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
   1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
   2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
   3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
   4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
   1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.11 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

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

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
   1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. At fire-protection-rated openings, install frames according to NFPA 80.
b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
c. Install frames with removable glazing stops located on secure side of opening.
d. Install door silencers in frames before grouting.
e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
   a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
   b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
   c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
   d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Solid-core doors with wood-veneer faces.
   2. Factory finishing flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.
   4. Factory to install glass in all lite openings.

B. Related Sections:
   1. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.3 REGULATORY REQUIREMENTS

A. Interior hinged door-opening force: 5 pounds maximum.

B. Vision panels in corridor doors must be at least 30 inches high with the lower edge no higher than 40 inches above the finished floor.

1.4 SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
   1. Indicate dimensions and locations of mortises and holes for hardware.
   2. Indicate dimensions and locations of cutouts.
   3. Indicate requirements for veneer matching.
   4. Indicate doors to be factory finished and finish requirements.
   5. Indicate fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors, provide two (2) full sets of factory finish samples, in the veneers selected, minimum 6 x 6 inches in size.

D. Samples for Verification:
   1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and

transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used. Provide if requested by the Architect.
   a. Provide samples for each species of veneer and solid lumber required.
   b. Provide samples for each color, texture, and pattern of plastic laminate required.
   c. Finish veneer-faced door samples with same materials proposed for factory-finished doors.

E. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors from single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."

C. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL 10C.
   1. Provide intumescent requirements in compliance with UL-10C, Catagory A.
   2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Algoma Hardwoods, Inc.
   2. Marshfield Door Systems, Inc
   3. Eggers Industries.
   4. VT Industries, Inc.

2.2 DOOR CONSTRUCTION, GENERAL

A. WDMA I.S.1-A Performance Grade:
   1. Heavy Duty unless otherwise indicated.
   2. Extra Heavy Duty: janitor's closets, corridor doors providing horizontal separation, assembly spaces and exits

B. Particleboard-Core Doors:
   1. Particleboard: ANSI A208.1, Grade LD-2.
   2. Provide doors with blocking comprised of structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

C. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
   1. Pairs: Provide formed-steel edges and astragals, field paint.

D. Mineral-Core Doors:
   1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
   2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
   3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: White Birch.
3. Cut: Plain Sliced.
4. Match between Veneer Leaves: Random Match
5. Assembly of Veneer Leaves on Door Faces: Book match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Exposed Vertical Edges: Same species as faces or a compatible species.
8. Core: Particleboard or Structural composite lumber.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 LIGHT FRAMES

A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

B. Frames for Light Openings in 60 min and greater Fire-Rated Doors:
   1. Provide veneer clad non-combustible glass stops at rated doors.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
   1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
   2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Cut and trim openings through doors in factory.
   1. Light Openings: Trim openings with moldings of material and profile indicated.

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory.

C. Transparent Finish: **> review & verify <**
   1. Grade: Premium.
   2. Finish: WDMA TR-6 catalyzed polyurethane.
   3. Staining: As selected by Architect from manufacturer's full range.
   4. Sheen: Satin

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

E. All doors to be factory glazed.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

SECTION 08 31 00 - ACCESS DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Wall and ceiling access doors.

B. Related Sections include the following:
   1. Section 09 91 00 - Painting.

1.3 SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

D. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS:

1.4 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
   2. NFPA 288 for fire-rated access door assemblies installed horizontally.

1.5 QUALITY ASSURANCE

A. Source limitations: Obtain doors and frames through one source from a single manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable Manufacturers include:
1. Babcock-Davis Hatchways, Inc. (www.babcockdavis.com)
2. J.L. Industries. (www.jlindustries.com)
3. Karp Associates, Inc. (www.karpinc.com)
4. Milcor. (www.milcorinc.com)
5. Nystrom Building Products, Inc. (www.nystrom.com)

2.2 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879, with cold-rolled steel sheet substrate complying with ASTM A1008, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A666, Type 304 or Type 316. Remove tool and die marks and stretch lines or blend into finish.

E. Frame Anchors: Same type as door face.

F. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153 or ASTM F2329.

2.3 FABRICATION

A. Door-Frame Type
1. Style DW, typical at non-rated gypsum board walls and ceilings.
2. Style UFR-DW, typical at rated gypsum board walls and ceilings.
3. Style M, with stainless steel door, at porcelain ceramic tile walls.

B. Fabricate door frame of steel sheet:
1. Doors 16 x 16 inches and smaller: Minimum 18 gage.

2. Doors over 16 x 16 inches: Minimum 16 gage.
3. Fabricate frames with flange type to suit installation conditions.
4. Provide mounting holes in frames to attach frames to metal framing in gypsum board construction.

C. Door-Frame Type (Babcock-Davis)
1. Style BNT, typical at non-rated masonry walls.
2. Style BUT, typical at rated masonry walls.
3. Style BNW, typical at non-rated gypsum board walls and ceilings.
4. Style BIW, typical at non-rated gypsum board walls and ceilings.

D. Fabricate non-rated door panels of minimum 14 gage steel sheet.
1. Provide 16 gage stainless steel with No. 4 satin finish where indicated.

E. Fabricate fire rated door panels of two sheets of minimum 20 gage steel sheet. Fill core with noncombustible insulation.

F. Weld, fill, and grind joints to flush and square appearance.

G. Finish:
1. Manufacturer's standard rust inhibitive factory applied prime coat.
2. Type No. 304 stainless steel with No. 4 satin finish.

H. Hardware:
1. Continuous steel hinges, 175 degree opening.
2. Automatic closers and self-latching mechanism for fire rated doors and smoke rated doors.
3. Latching mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
a. Screwdriver cam latch, standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 00

SECTION 08 33 23 – COILING OVERHEAD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Insulated service doors, chain operated, prime painted.

B. Related Sections:
   1. Division 05 Section "Metal Fabrications" for miscellaneous steel supports.
   2. Division 09 Section "Painting" for finish painting of factory-primed doors.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Exterior overhead coiling doors shall withstand the wind loads, the effects of gravity loads, and loads and stresses within limits and under conditions indicated according to SEI/ASCE 7.
   1. Wind Loads: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
   2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

B. Operability under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. wind load, acting inward and outward.

1.4 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:
   1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
   3. For fire-rated doors, description of fire-release system including testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
   1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

C. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

PART 2 - PRODUCTS

2.1 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains (insulated service door): Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A653, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch minimum and as required to meet requirements.
   2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84. Enclose insulation completely within slat faces.
   3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.
   4. Gasket Seal: Provide insulated slats with manufacturer's standard interior-to-exterior thermal break or with continuous gaskets between slats.

B. Endlocks and Windlocks for Service Doors: Malleable-iron casings galvanized after fabrication, secured to curtain slats with galvanized rivets or high-strength nylon. Provide locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

C. Bottom Bar for Service Doors: Consisting of two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from manufacturer's standard hot-dip galvanized steel or stainless steel.

D. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent over-travel of curtain, and a continuous bar for holding windlocks.

2.2 HOOD

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
   1. Galvanized Steel (service): Nominal 0.028-inch- thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A653.
   2. Provide full cover for door operating mechanism, chain, gears, etc., at door head.

2.3 LOCKING DEVICES

A. Slide Bolt (service door): Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Chain Lock Keeper: Suitable for padlock.

2.4 CURTAIN ACCESSORIES

A. Weatherseals: Equip each exterior door with weather-stripping gaskets fitted to entire perimeter of door for a weathertight installation, unless otherwise indicated.
   1. At door head, use 1/8-inch- thick, replaceable, continuous sheet secured to inside of hood.
   2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene.

2.5 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Spring Balance: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.6 MANUAL DOOR OPERATORS

A. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25 lbf force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

2.7 DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Cookson Company.
      b. Cornell Iron Works, Inc.
      c. Overhead Door Corporation.
      d. Raynor.
      e. Windsor Door.

B. Curtain R-Value: 6.0 deg F x h x sq. ft./Btu.

C. Door Curtain Material: Galvanized steel.

D. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
   1. Insulated-Slat Interior Facing: Metal.

E. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

F. Hood: Match curtain material and finish.
   1. Shape: Round.
   2. Mounting: Face of wall.

G. Locking Devices: Equip door with locking device assembly and chain lock keeper.

H. Manual Door Operator: Chain-hoist operator.

I. Door Finish:
   1. Factory Prime Finish: Manufacturer's standard color.
   2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.8 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 STEEL AND GALVANIZED-STEEL FINISHES

A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

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

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Fire-Rated Doors: Install according to NFPA 80.

E. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Perform installation and startup checks according to manufacturer's written instructions.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide weathertight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 08 33 23

SECTION 08 34 93 –FABRIC SMOKE CURTAIN

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Smoke detector activated smoke containment screen and control system designed to provide a tight-fitting, smoke- and draft-control assembly.

B. Products Supplied But Not Installed Under This Section:
1. End-of-line diode (3.9V, 2W). Installed at smoke detector to monitor the circuit.

C. Related Sections:
1. Division 09 –Non-Load Bearing Wall Framing: Metal backing in housing mounting area.
2. Division 09–Paints: Field painting of specified components.
3. Division 28–Detection and Alarm: Provision of smoke detectors.
4. Division 14–Electric Traction Elevators.
5. Division 26 Sections for control circuit power including conduit, boxes, conductors, wiring devices, and emergency power.

1.02 REFERENCES

A. ASTM A240/240M – Standard Specification for Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.

B. Codes and Standards:
1. NFPA 70 – National Electrical Code.
2. NFPA 72-2002 and 2007 – National Fire Alarm Code
3. ASTM - E84 - Test Method for Surface Burning Characteristics of Building Materials

C. International Building Code
1. 2006

D. UL Standards:
1. 268 – Smoke Detectors for Fire Protective Signaling Systems.
2. 864 – Control Units for Fire Protective Signaling Systems.
3. 1784 – Air Leakage Tests for Door Assemblies.

1.03 SUBMITTALS

A. Reference Division 01–Submittal Procedures; submit following items:
1. Product Data.
2. Shop Drawings: Include door width and height, jamb width, jamb and head projection, screen width, mounting height, and housing width. Show and identify related work performed under other sections of the specifications.
3. Quality Assurance/Control Submittals:

a. Qualifications:
   1) Proof of manufacturer qualifications.
   2) Proof of Installer qualifications.
b. Certifications: Copy of specified items.
c. Manufacturer's installation instructions and testing procedures

B. Product Datacenter
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sound barrier wall end cap system

C. Shop Drawings
   1. Include typical dimensioned cross-section(s) at the location where drywall partition terminates at the perimeter curtain wall, indicating
      a. Dimensions as shown on the drawings.
      b. Finish as shown on the drawings.
      c. Samples: For each exposed product and for each color and texture specified.
      d. Size: 12 inches
   2. Provide Qualification of Installers

D. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.04 CLOSEOUT SUBMITTALS

A. Comply with Division 01- Closeout Submittals; submit following items:
   1. Operation and Maintenance Manual and Video.
   2. Manufacturer's Warranties

1.05 QUALITY ASSURANCE

A. Overall Standards:
   1. Manufacturer shall maintain a quality control program in accordance with ICC-ES Acceptance Criteria 77.

B. Qualifications:
   1. Manufacturer Qualifications: Minimum seven years experience in producing smoke containment systems of the type specified.
   2. Installer Qualifications: Factory trained by manufacturer.

C. Certifications:
   1. Manufacturer's ICC Evaluation Service report ESR-1136 showing compliance with:
      a. ICC-ES AC77
      b. UL standard 1784
      c. ASTM E84
      d. NFPA 105

2. IAS (IAS is a trademark of International Accreditation Service) Accredited Testing Laboratory Labels for UL Standard 1784
3. IAS (IAS is a trademark of International Accreditation Service) Accredited Testing Laboratory Labels for UL Standard 864
4. California Department of Forestry and Fire Protection and Office of the State Fire Marshal Listing.
5. OSHPD Anchorage Pre-Approval No. OPA-0318

D. Pre-Installation Meeting:
1. Schedule and convene a pre-installation meeting prior to commencement of field operations with representatives of the following in attendance: Owner, Architect, General Contractor, smoke containment system sub-contractor, painting sub-contractor, and electrical sub-contractor.
2. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.
3. Keep minutes of meeting including responsibilities of various parties and deviations from specifications and installation instructions.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's instructions.

1.07 WARRANTY

A. Provide manufacturer's standard one year warranty.

B. Maintenance and Testing:
1. Perform minimum semi-annual maintenance and testing on each smoke containment system as required by the manufacturer's warranty, code agency evaluation reports, and as required by local authority having jurisdiction.
2. Provide test documentation.

PART 2 - PRODUCTS

2.01 MANUFACTURED UNITS

A. Model 2100

B. Manufacturer:
1. Smoke Guard, or performance and warranty quality equal

C. Label each smoke containment system with following information:
1. Manufacturer's name.
2. Maximum leakage rating at specified pressure and temperature conditions.
3. Label of quality control agency.

2.02 PERFORMANCE

Air Leakage: Not to exceed 3 cfm (0.001416 m^3/s) per sf of door opening at 0.1 in (25 Pa) water pressure differential at ambient temperature and 400 degrees F (204 degrees C) tested per IBC 2006, 2009, and 2012

2.03 COMPONENTS

A. Screen:
   1. Film: Minimum Curtain Fabric: SG Tex 10 - Glass fiber material coated on one side with a polyester polyurethane latex.
   2. Magnetic Strips: Flexible multi-pole strips attached to longitudinal edges of film with low modulus silicone adhesive.

B. Mandatory Auxiliary Rails:
   1. Material: 16 gage ASTM A 240/240M, Type 430, ferritic stainless steel.
   2. Size: 2 in (51 mm) wide, 1” (25 mm) deep, as shown in Shop Drawings.

C. Rewind Motor:
   1. Tubular motor with fail safe gravity deploy operation.
   2. 24 VDC.

D. Control System:
   1. Comply with UL Standard 864.
   2. Battery backup supplied with the controls.
   3. 120 VAC

E. Release Mechanism: IAS (IAS is a trademark of International Accreditation Service) Accredited Testing Laboratory Labels for UL Standard 864

F. Screen Rewind Switch: Include switch to rewind screen into housing.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates upon which work will be installed.
   1. Verify related work performed under other sections is complete and in accordance with Shop Drawings.
   2. Verify wall surfaces and elevator door frames are acceptable for installation of smoke containment system components.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate

3.02 INSTALLATION

A. Install smoke containment system components in accordance with manufacturer’s installation instructions.

B. Provide ferrous metal backing strips behind the face of stainless steel frames at elevator openings.

3.03 FIELD QUALITY CONTROL

A. Field Test: Follow manufacturer's cycle test procedures.
   1. Notify Owner's Representative, local Fire Marshal, alarm sub-contractor and [elevator sub-contractor] [elevator service company] minimum one week in advance of scheduled testing.
   2. Complete maintenance service record

3.04 DEMONSTRATION

A. Demonstrate testing and maintenance procedures to Owner's Representative.

B. Maintenance and Testing:
   1. Perform minimum semi-annual maintenance and testing on each smoke containment system as required by the manufacturer's warranty, code agency evaluation reports, and as required by local authority having jurisdiction.
   2. Retain permanent record of tests.

C. Future Painting: Paint elevator door frame and/or auxiliary rails in accordance with Operation and Maintenance Manual.

D. Qualified Smoke Guard Inspector assesses unit(s) after exposure to a fire event.

END OF SECTION

SECTION 08 41 13 - ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Aluminum entrance doors, standard and thermally improved.
2. Frames for entrances including transoms and sidelights.
3. Frames for interior wood doors.
4. Storefront-type window framing system with applied muntin bars and custom extruded aluminum sills.
5. Tilting Light Shelf

B. Related Sections include the following:
1. Section 07 92 00 - Joint Sealants.
2. Section 08 44 13 - Glazed Aluminum Curtain Walls.
3. Section 08 71 00 - Door Hardware.
4. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

A. ADA - Americans With Disabilities Act.

B. American Society for Testing and Materials (ASTM):
1. ASTM B117 - Practice for Operating Salt Spray (Fog) Apparatus.
2. ASTM B221 - Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
3. ASTM B633 - Specification for Electrodeposited Coating of Zinc on Iron and Steel.
4. ASTM D659 - Test Method for Evaluating Degree of Chalking of Exterior Paint Films.
5. ASTM D968 - Test Method for Abrasion Resistance of Organic Coatings by the Falling Abrasive.
6. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100 Percent Relative Humidity.
7. ASTM E283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
9. ASTM E1105 - Standard Test Method for Field Determination of Water

Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide aluminum entrance and storefront assemblies that comply with performance characteristics specified, as demonstrated by testing the manufacturer's corresponding stock assemblies according to test methods indicated.

B. Thermal Movement: Design the aluminum entrance and storefront framing systems to provide for expansion and contraction of the component materials. Entrance doors shall function normally over the specified temperature range.
   1. The system shall be capable of withstanding a metal surface temperature range of 180 degrees F without buckling, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, stress on glass, or other detrimental effects.

C. Design Requirements: Provide aluminum entrance and storefront systems that comply with structural performance, air infiltration, and water penetration requirements indicated.
   1. Wind Loads: Provide aluminum entrance and storefront assemblies capable of withstanding wind pressures of 20 psf inward and 20 psf outward acting normal to the plane of the wall.

D. Structural Performance: Conduct tests for structural performance in accordance with ASTM E330. At the conclusion of the tests there shall be no glass breakage or permanent damage to fasteners, anchors, hardware or actuating mechanism. Framing members shall have no permanent deformation in excess of 0.2 percent of their clear span.
   1. Deflection Normal to the Plane of the Wall: Test pressure required to measure deflection of framing members normal to the plane of the wall shall be equivalent to the wind load specified above. Deflection shall not exceed 1/175 of the clear span, when subjected to uniform load deflection test.
   2. Deflection Parallel to the Plane of the Wall: Test pressures required to measure deflection parallel to the plane of the wall shall be equal to 1.5 times the wind pressures specified above. Deflection of any member carrying its full dead load shall not exceed an amount that will reduce glass bite below 75 percent of the design dimension and shall not reduce the edge clearance between the member and the fixed panel, glass or other fixed member above to less than 1/8 inch. The clearance between the member and an operable door or window shall be at least 1/16 inch.

E. Air Infiltration: test components according to ASTM E283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft.
   1. Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area.
   2. Maximum air leakage through commercial swinging entrance doors of

1.0 cfm/sq. ft. of door area.

F. Water Penetration: Provide framing systems with no uncontrolled water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E331 at an inward test pressure differential of 10.00 lbf per sq. ft.

G. Condensation Resistance: Where framing systems are "thermal-break" construction, provide units tested for thermal performance in accordance with AAMA 1503 showing condensation resistance factor (CRF) of not less than 53.

H. Thermal Transmittance: Provide framing systems that have an overall U-value of not more than 0.70 BTU/(hr. x sq. ft. x degrees F) at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.

I. Average Thermal Conductance: when tested according to AAMA 1503, provide an average U-factor of not more than;
1. 0.50 for glazed storefront systems.
2. 0.85 for entrance doors.

1.5 SUBMITTALS

A. Product data for each aluminum entrance and storefront system required, including:
1. Manufacturer's standard details and fabrication methods.
2. Data on finishing, and accessories.
3. Recommendations for maintenance and cleaning of exterior surfaces.

B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of aluminum entrance and storefront systems.
1. Shop drawings shall be coordinated with other building cladding products to accurately indicate substrate conditions and materials, the correct interface conditions at adjoining cladding systems, accurate details of the adjoining cladding components, interface flashings and or cavity closures. Provide isometrics to clearly indicate required construction sequencing.

C. Shop drawings for each aluminum entrance and storefront system required, including:
1. Layout and installation details, including relationship to adjacent work.
2. Elevations at 1/4-inch scale.
3. Detail sections of typical composite members.
4. Anchors and reinforcement.
5. Hardware mounting heights.
6. Provisions for expansion and contraction.
7. Glazing details.
8. Shop drawings shall include a complete set of manufacturer's fabrication and installation instructions.
9. Shop drawings shall be sealed by a registered engineer licensed in the

State of Tennessee.

D. Hardware Schedule: Submit complete hardware schedule organized into sets based on hardware specified. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Include item name, name of the manufacturer and complete designations of every item required for each door opening.

E. Samples for Initial Color Selection: Submit pairs of samples of each specified color and finish on 12-inch-long sections of extrusions or formed shapes. Where normal color variations are anticipated, include 2 or more units in each set of samples indicating extreme limits of color variations.

F. Samples for Verification Purposes: The Architect reserves the right to require additional samples, that show fabrication techniques and workmanship, and design of hardware and accessories.

G. Provide material samples and accessories for sample wall panel / mock-up as indicated on sheet A2.1, and specified in Section 01 40 00.
   1. Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.

H. Test Reports: Provide certified test reports from a qualified independent testing laboratory showing that aluminum entrance and storefront systems have been tested in accordance with specified test procedures and comply with performance characteristics indicated.

I. Written Certification: From systems manufacturer certifying that the installer meets qualification requirements specified under Quality Assurance in this Section.

J. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMNTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed installations of aluminum storefront and entrances similar in design and extent to those required for the project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer's Qualifications: Provide aluminum entrances and storefront systems produced by a firm with a minimum of five years experience in manufacturing systems that are similar to those indicated for this project and that have a record of successful in-service performance.

C. Fabricator Qualifications: Provide aluminum entrances and storefront systems fabricated by a firm experienced in producing systems that are similar to those indicated for this Project, and that have a record of successful in-service performance. The fabricator shall have sufficient production capacity to produce components required without causing delay in progress of the Work.

D. Single Source Responsibility: Obtain aluminum entrance and storefront systems from one source and from a single manufacturer.

E. Design Criteria: The drawings indicate the size, profile, and dimensional requirements of aluminum entrance and storefront work required and are based on the specific types and models indicated. Aluminum entrance and storefront by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum entrance and storefront components in the manufacturer's original protective packaging.

B. Store aluminum components in a clean dry location away from uncured masonry or concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.
   1. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

1.8 PROJECT CONDITIONS

A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.
   1. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

1.9 WARRANTY

A. Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace units that fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to:
   1. Structural failures including excessive deflection, excessive leakage or air infiltration.
   2. Faulty operation.
   3. Deterioration of metals, metal finishes and other materials beyond normal weathering.

B. Warranty Period: 2 years after the date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights or remedies the Owner

may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-Design Product: The design for curtain-wall systems is based on products of the first named manufacturer. Subject to compliance with requirements, provide the named product or a comparable product by one of the manufacturers as follows:
   1. Alcoa/Kawneer North America.
   2. Vistawall Architectural Products.
   3. United States Aluminum Corp.
   4. YKK Architectural Products.

2.2 COMPONENTS

A. Exterior Storefront System: thermally broken, flush glazed system nominal 2 x 6 inch profile, to receive 1 inch insulating glass, center glazed:
   1. Alcoa/Kawneer North America - TriFab 601 T
   2. Vistawall Architectural Products
   3. United States Aluminum Corp.
   4. YKK Architectural Products

B. Interior Storefront System: (no thermal break) flush glazed system nominal 2 x 6 inch profile, to receive 1/4 inch glass, center glazed:
   1. Alcoa/Kawneer North America. TriFab VG451
   2. Vistawall Architectural Products
   3. United States Aluminum Corp.
   4. YKK Architectural Products

C. Interior Light Shelf: Translucent Polycarbonate Panels
   1. 30” deep with tilt feature
   2. Provide manufacturer’s system for attachment to storefront and curtainwall systems.
   3. Provide colors from manufacture’s full line of options.

2.3 ENTRANCE DOORS

A. Aluminum entrance doors, exterior, thermally improved, wide stile, 10 inch bottom rail, single swing:
   1. Alcoa/Kawneer North America - Insulclad 560.
   2. Vistawall Architectural Products - WS500T.
   3. United States Aluminum Corp. – 500 Center Hung.
   4. YKK Architectural Products 35/50XT

B. Aluminum entrance doors, interior, not thermally improved, wide stile, 10 inch bottom rail, single swing:
   1. Alcoa/Kawneer North America - 500 Wide Stile.
   2. Vistawall Architectural Products - WS500.
   3. United States Aluminum Corp. – 500 Center Hung.
   4. YKK Architectural Products 35D

C. Horizontal mullions: nominal 2 1/4 inch, true horizontal mullions.

D. Applied Mullions (Window Type B): 1/8 inch thick by 1 inch wide clear anodized aluminum stock, adhesively applied to spandrel glass.

E. Storefront assemblies shall include manufacturers high performance extruded sub sill that is fastened to the substrate, fasteners sealed and requires no "blind seals" at sill when sill is engaged to sub sill. Jambs and heads shall have thermally broken pocket fillers sealed in place with end caps and end dams. The Performance rating of the system shall not be calculated using space outside of the limits of the frame such as space between Frame and Frame opening.

F. Glass Stops: manufacturers standard bevel glass stops.

G. Door hardware, Single and double doors:
   1. Weather Stripping and Astragals: Manufacturer's standard replaceable components.
   2. Door Sweep: Manufacturer's standard replaceable components.
   3. Reference Section 08 71 00 - Door Hardware for remainder of door hardware.

2.4 MATERIALS

A. Aluminum Members: Alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B221 for aluminum extrusions, ASTM B209 for aluminum sheet or plate, and ASTM B211 for aluminum bars, rods and wire.

B. Carbon steel reinforcement of aluminum framing members shall comply with ASTM A36 for structural shapes, plates and bars, ASTM A611 for cold rolled sheet and strip, or ASTM A570 for hot rolled sheet and strip.

C. Glass and Glazing Materials: Comply with requirements of "Glazing" section of these specifications.

D. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, zinc plated steel, or other material warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors and other components.
   1. Reinforcement: Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard

noncorrosive pressed-in splined grommet nuts.

2. Exposed Fasteners: Do not use exposed fasteners except for application of hardware. For application of hardware, use Phillips flat-head machine screws that match the finish of member or hardware being fastened.

E. Concealed Flashing: 0.0179-inch (26 gage) minimum dead-soft stainless steel, or 0.026-inch-thick minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.

F. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123.

G. Concrete and Masonry Inserts: Provide cast iron, malleable iron, or hot-dip galvanized steel inserts complying with ASTM A123.

H. Compression Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D2000 or molded PVC complying with ASTM D2287.

I. Sliding Weatherstripping: Manufacturer's standard replaceable weatherstripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

2.5 HARDWARE

A. General: Refer to Division 8 Section "Door Hardware" for requirements for hardware items other than those indicated to be provided by the aluminum entrance manufacturer.

B. Provide heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number, and type recommended by manufacturer for service required; finish to match door.

1. Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D2000 or molded PVC complying with ASTM D2287.

2.6 FABRICATION

A. General: Fabricate aluminum entrance and storefront components to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes and profile requirements are indicated on the drawings. Variable dimensions are indicated, with maximum and minimum dimensions required, to achieve design requirements and coordination with other work.

1. Thermal-Break Construction: Fabricate storefront framing system with an integrally concealed, low-conductance thermal barrier, located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact. Use manufacturer's standard construction that has been in use for similar projects for period of not less than 3 years.

B. Prefabrication: Complete fabrication, assembly, finishing, hardware application,

and other work to the greatest extent possible before shipment to the Project site. Disassemble components only as necessary for shipment and installation.

1. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.
2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
3. Preglaze door and frame units to greatest extent possible.

C. Welding: Comply with AWS recommendations. Grind exposed welds smooth to remove weld spatter and welding oxides. Restore mechanical finish.

1. Welding behind finished surfaces shall be performed in such a manner as to minimize distortion and discoloration on the finished surface.

D. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.

E. Dissimilar Metals: Separate dissimilar metals with bituminous paint, or a suitable sealant, or a nonabsorptive plastic or elastomeric tape, or a gasket between the surfaces. Do not use coatings containing lead.

F. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members.

1. Uniformity of Metal Finish: Abutting extruded aluminum members shall not have an integral color or texture variation greater than half the range indicated in the sample pair submittal.

G. Fasteners: Conceal fasteners wherever possible.

H. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops. At other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.

1. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.
2. At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.

I. Extruded Storefront Sills: provide custom extruded sills, clear anodized, as indicated on the drawings.

2.7 FINISHES

A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

B. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.

C. Clear Anodic Finish: AAMA 611, AA-M12C22A41 Architectural Class I, clear coating 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and supports, with the Installer present, for compliance with requirements indicated, installation tolerances, and other conditions that affect installation of aluminum entrances and storefronts. Correct unsatisfactory conditions before proceeding with the installation.
   1. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation.

B. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Install components in proper alignment and relation to established lines and grades indicated. Provide proper support and anchor securely in place.

C. Construction Tolerances: Install aluminum entrance and storefront to comply with the following tolerances:
   1. Variation from Plane: Do not exceed 1/8 inch in 12 feet of length or 1/4 inch in any total length.
   2. Offset from Alignment: The maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 inch.
   3. Diagonal Measurements: The maximum difference in diagonal measurements shall not exceed 1/8 inch.
   4. Offset at Corners: The maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.

D. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
   1. Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.
   2. Paint dissimilar metals where drainage from them passes over aluminum.
   3. Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali resistant coating.
   4. Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subject to wetting, with two coats of aluminum house paint. Seal joints between the materials with sealant.

E. Drill and tap frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

F. Set sill members and other members in bed of sealant as indicated, or with joint

fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 07 for sealants, fillers, and gaskets.

G. Refer to Division 08 Section "Glazing" for installation of glass and other panels indicated to be glazed into doors and framing, and not preglazed by manufacturer.

3.3 ADJUSTING

A. Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.

3.4 CLEANING

A. Clean the completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings.

B. Clean glass surfaces after installation, complying with requirements contained in the "Glass and Glazing" Section for cleaning and maintenance. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

3.5 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

3.6 FIELD QUALITY CONTROL

A. Glazing contractor shall be responsible for providing all coordination and required assistance for the field testing of the mock up opening, and at least 4 openings in the field as selected by the Architect, in accordance with ASTM E1105 by a Qualified Testing Agency at 10 lbs. per sf vvith no reduction of pressure from laboratory tests.

END OF SECTION 08 41 13

SECTION 08 44 13 - GLAZED ALUMINUM CURTAIN WALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Conventionally glazed aluminum curtain wall system.
2. Nominal 7 1/2 inch deep system with 7/8 inch cover
3. Tilting Light Shelf

B. Related Sections include the following:
1. Section 07 84 56 - Fire Safing.
2. Section 07 92 00 - Joint Sealants.
3. Section 08 41 13 - Aluminum Entrances and Storefronts.
4. Section 08 80 00 - Glazing.

1.3 REFERENCE STANDARDS

A. ADA - Americans With Disabilities Act.

B. American Society for Testing and Materials (ASTM):
1. ASTM B117 - Practice for Operating Salt Spray (Fog) Apparatus.
2. ASTM B221 - Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
3. ASTM B633 - Specification for Electrodeposited Coating of Zinc on Iron and Steel.
4. ASTM D659 - Test Method for Evaluating Degree of Chalking of Exterior Paint Films.
5. ASTM D968 - Test Method for Abrasion Resistance of Organic Coatings by the Falling Abrasive.
6. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100 Percent Relative Humidity.
7. ASTM E283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
9. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide curtain wall systems, including anchorage, capable of withstanding, without failure, the effects of the following:
   1. Structural loads.
   2. Thermal Movements
   3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   4. Dimensional tolerances of building frame and other adjacent construction.
   5. Failure includes the following:
      a. Deflection exceeding specified limits.
      b. Thermal stresses transferred to building structure.
      c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
      d. Glazing-to-glazing contact.
      e. Noise or vibration created by wind and thermal and structural movements.
      f. Loosening or weakening of fasteners, attachments, and other components.
      g. Sealant failure.

B. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by curtain-wall systems without failing adhesively or cohesively. Provide sealant that fails cohesively before sealant releases from substrate when tested for adhesive compatibility with each substrate and joint condition required.
   1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
   2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

C. Structural-Sealant Joints: Designed to produce tensile or shear stress in structural-sealant joints of less than 20 psi.

D. Structural Loads:
   1. Wind Loads: 20 psf.
   2. Seismic Loads: As indicated on Drawings.

E. Structural-Test Performance: Provide glazed curtain-wall systems as follows:
   1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
   2. Test Duration: As required by design wind velocity but not less than 60 seconds.

F. Deflection of Framing Members:
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches, or an amount that restricts edge deflection

of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.

G. Cantilever Deflection: Where framing members overhang an anchor point, limited to 2 times the length of cantilevered member, divided by 175.

H. Thermal Movements: Provide structural-sealant-glazed curtain-wall systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces.
   2. Test Performance: No buckling, stress on glass, glazing edge-seal failure, sealant failure, excess stress on curtain-wall framing, anchors and fasteners, or reduction of performance when tested according to AAMA 501.5
      a. Test High Exterior Ambient Air Temperature: That which produces an exterior metal surface temperature of 180 degrees F.
      b. Test Low Exterior Ambient Air Temperature: 0 degrees F.
      c. Test Interior Ambient Air Temperature: 75 degrees F.

I. Air Infiltration: Provide structural-sealant-glazed curtain-wall systems with maximum air leakage of 0.06 cfm/sq.ft. of fixed wall area when tested according to ASTM E283 at a minimum, static-air-pressure differential of 6.24 lbf/sq.ft.

J. Water Penetration Under Static Pressure: Provide glazed curtain wall systems that do not evidence water leakage when tested according to ASTM E1105 under static pressure equal to 20 percent of positive design wind load, but not less 12 lbf/sq.ft..

K. Water Penetration Under Dynamic Pressure: Provide glazed curtain wall systems that do not evidence water leakage when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive design wind load, but not less than 10 lbf/sq.ft.
   1. Maximum Water Leakage: No uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that are drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

L. Condensation Resistance: Provide glazed curtain wall systems with condensation-resistance factor (CRF) of not less than 55 when tested according to AAMA 1503.

M. Average Thermal Conductance: Provide glazed curtain wall systems with average U-factor of not more than 0.66 Btu/sq.ft. x h x deg F when tested according to AAMA 150

N. Sound Transmission: Provide glazed curtain wall systems with minimum STC of 32 according to ASTM E413 and an OITC of 26 according to ASTM E1332, as determined by testing according to ASTM E90.

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions, of individuals components and profiles, and finishes for each type of product indicated.

B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of glazed curtain wall systems.
   1. Shop drawings shall be coordinated with other building cladding products to accurately indicate substrate conditions and materials, the correct interface conditions at adjoining cladding systems, accurate details of the adjoining cladding components, interface flashings and or cavity closures. Provide isometrics to clearly indicate required construction sequencing.

C. Shop drawings for each glazed aluminum curtain wall system required, including:
   1. Layout and installation details, including relationship to adjacent work.
   2. Elevations at 1/4-inch scale.
   3. Detail sections of typical composite members.
   4. Anchors and reinforcement.
   5. Hardware mounting heights.
   6. Provisions for expansion and contraction.
   7. Glazing details.
   8. Shop drawings shall include a complete set of manufacturer's fabrication and installation instructions.
   9. Shop drawings shall be sealed by a registered engineer licensed in the State of Tennessee.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from 12-inch lengths of full-size components and showing details of the following:
   1. Joinery.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.

F. Provide material samples and accessories for sample wall panel / mock-up as indicated on sheet A2.1, and specified in Section 01 40 00.
   1. Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.

G. Field quality-control test and inspection reports.

H. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

I. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
   1. Engineering Responsibility: Preparation of data for glazed curtain wall systems including the following:
      a. Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field-testing, and in-service performance.
   1. Do not modify intended aesthetic effects, as judge solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

C. Preconstruction Sealant Testing: Perform sealant manufacturer's standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by curtain wall systems.
   1. Test a minimum of five samples of each metal, glazing, and other material.
   2. Prepare samples using techniques and primers required for installed systems.
   3. Perform tests under environmental conditions that duplicate those under which systems will be installed.
   4. For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for a each material, retest materials.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for glazed curtain wall systems by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating structural-sealant-glazed curtain-wall systems without field

measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of structural-sealant-glazed curtain-wall systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise of vibration caused by thermal movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Adhesive or cohesive sealant failures.
      e. Water leakage.
      f. Failure of operating components to function normally.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The design for structural-sealant-glazed curtain-wall systems is based on 1600 Wall System 1, manufactured by Kawneer Corporation. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
   1. Vistawall Architectural Products.
   2. United States Aluminum Corp.
   3. YKK Architectural Products

2.2 FRAMING SYSTEMS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Sheet and Plate: ASTM B209.
   2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B221.
   3. Extruded Structural Pipe and Tubes: ASTM B429.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
   1. Structural Shapes, Plates, and Bars: ASTM A36.
   2. Cold-Rolled Sheet and Strip: ASTM A611.
   3. Hot-Rolled Sheet and Strip: ASTM A570.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.

D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Where fasteners are subject to loosening or turn out form thermal and structural movements, win loads, or vibration, use self-locking devices.
2. Reinforce members as required to receive fastener threads.
3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.

E. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123 or ASTM A153 requirements.

F. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding flashing compatible with adjacent materials. Provide dams at end of all flashings.

G. Framing Gaskets: As recommended by manufacturer for joint type.

H. Framing Sealants: As recommended by manufacturer for joint type.

2.3 GLAZING SYSTEMS

A. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, non-migrating types compatible with sealants and suitable for joint movement and system performance requirements.

B. Glazing Sealants: As recommended by manufacturer for joint type and as follows:

1. Structural Sealant: ASTM C1184, neutral-curing silicone formulation compatible with system components with which it comes in contact, specifically formulated and tested for use as structural-sealant manufacturer for use in curtain wall systems indicated.
   a. Color: As selected by Architect from manufacturer's full range of colors.
   b. Type: Manufacturer's standard single or two components.
   c. Minimum Tensile Strength: 100 psi.
   d. Modulus of Elasticity: As required by glazed curtain wall system design to meet performance requirements.

C. Weather seal Sealant: ASTM C920 for Type S, Grade NS, Class 25, uses NT, G, A and O; neutral-curing silicone formulation compatible with structural sealant and other system components with which it comes in contact; and recommended by structural-and weather seal sealant and curtain wall manufacturers for this use.

   a. Joint Movement Capability: Accommodates a 50 percent increase or decrease in joint width at time of application when measured according to ASTM C719.

b. Color: As selected by Architect from manufacturer's full range of colors.

2.4 ACCESSORY MATERIALS

A. Perimeter Fire-Containment systems (Safing Insulation): reference Division 07 Section Safing.

B. Interior Light Shelf: Translucent Polycarbonate Panels
1. 30” deep with tilt feature
2. Provide manufacturer’s system for attachment to storefront and curtainwall systems.
3. Provide colors from manufacture’s full line of options.

C. Insulating Materials: reference Division 07 Section Thermal Insulation.

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.5 FABRICATION

A. Form aluminum shapes before finishing.

B. Fabricate components that, when assembled, have the following characteristics:
1. Sharp profiles, straight and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to prevent glazing-to-glazing contact and to maintain required glazing edge clearances.
6. Structural-sealant joints that do not carry gravity loads of glazing.
7. Provisions for field replacement of glazing from exterior. Include accommodations for using temporary support device (Dutchman) to retain glazing in place while sealant cures.

C. Factory-Assembled Frame Units:
1. Rigidly secure non-movement joints.
2. Seal Joints watertight, unless otherwise indicated.
3. Pressure equalize system at its interior face.
4. Install glazing to comply with requirements in Division 08 Section to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

D. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.6 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Clear Anodic Finish: AAMA 611, AA-M12C22A41 Architectural Class I, clear coating 0.018 mm or thicker.

2.7 SOURCE QUALITY CONTROL

A. Perform quality-control procedures complying with ASTM C1401 recommendations including, but not limited to, system material qualification procedures, sealant testing, and system fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:
1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure non-movement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal joints watertight, unless otherwise indicated.

B. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Division 08 Section Glazing. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

F. Install weather seal sealant according to Division 07 Section Joint Sealants and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Install perimeter fire-containment systems (safing insulation) as specified in Division 07 Section Safing.

H. Erection Tolerances: Install structural-sealant-glazed curtain-wall systems to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
   2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
      c. Where surfaces are separated by reveal or protruding element of 1 inch wide or greater, limit offset from true alignment to 1/4 inch.
   4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.3 FIELD QUALITY CONTROL

A. Glazing contractor shall be responsible for providing all coordination and required assistance for the field testing of the mock up opening, and at least 4 openings in the field as selected by the Architect, in accordance with ASTM E1105 by a Qualified Testing Agency at 10 lbs. per sf with no reduction of pressure from laboratory tests.

3.4 PROTECTION

A. Protect installed materials from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where material is subject to abuse.

END OF SECTION 08 44 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Hardware for wood and hollow metal doors.
   2. Maintenance.
   3. Coordinate finish hardware work with work of other trades as required.

B. Related Sections include the following:
   1. Division 08 Section Metal Doors and Frames
   2. Division 10 Section "Toilet Accessories" for coat hooks.

1.3 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.4 REFERENCES

A. United States Standard (US) is used as a reference standard for finish designations.

B. Door and Hardware Institute (DHI) "Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames" is used as a reference standard for hardware locations.
   1. This standard is referred to as "DHI Recommended Locations".
   2. Maintain copy of this standard at job site during progress of work.

1.5 REGULATORY REQUIREMENTS

A. For fire-rated door assemblies, provide hardware listed in Underwriters' Laboratories "Building Materials Directory", edition current at time of installation. Fire rated assemblies shall be tested in accordance with UL10C, positive pressure testing.

B. Comply with National Fire Protection Association (NFPA) "Standard for Fire Doors and Windows, NFPA 80" for products and installation.

C. Exterior and interior passage doors with latching hardware must be equipped with operating hardware devices that comply with accessibility requirements of

codes adopted by the Authority Having Jurisdiction (e.g. lever handle, push/pull latch, etc.).

D. Provide textured surface on door handles leading to hazardous areas (i.e. boiler rooms, electrical equipment rooms, etc.).

1.6 SUBMITTALS

A. Cooperate with Finish Hardware supplier in scheduling dates for submittals and delivery of templates and finish hardware.

B. Submit hardware schedule in manner indicated below. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function and finish of hardware.

C. Final hardware schedule: Based on finish hardware, organize a schedule into "Hardware Sets" containing all items required for each door opening. Include the following information:
   1. Type, style, function, size, finish and manufacturer of each hardware item.
   2. Explanation of abbreviations, symbols, codes, etc. contained in schedule.
   3. Fastening and other pertinent information.
   4. Location of hardware set cross-reference to drawings.
   5. Mounting locations for hardware.
   6. Door frame size and material.
   7. Set numbering shall match that indicated in the specifications.

D. Submit schedule at earliest possible date since acceptance of hardware schedule must precede fabrication of other work (i.e., hollow metal frames) critical to construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to a coordinated review of hardware schedule.

E. Submit separate electrical riser diagram and point to point connection for all electrical hardware items. Include verbal description of system function.

F. Furnish templates to fabricators of doors, frames, and other work to be factory prepared for the installation of hardware. Upon request, check shop drawings of each other's work, to confirm that adequate provisions are made for proper location and installation of hardware.

G. No hardware shall be ordered until hardware and electrical schedules have been approved by the Architect.

H. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.7 QUALITY ASSURANCE

A. Obtain each type of Hardware (i.e., locks) from a single manufacturer.

B. "Supplier" refers to a recognized architectural hardware supplier, with warehouse facilities, furnishing hardware for not less than 2 years, and who is, or who employs an experienced Architectural Hardware Consultant who, at reasonable times during the course of the work, is available for consultation with the Owner, Architect and Contractor about the project's requirements.

C. Suppliers Qualifications: Employ a full time Architectural Hardware Consultant (AHC) for consultation to Architect about project's hardware requirements, during the course of the Work.

D. Comply with American National Standards Institute (ANSI) Builders Hardware Manufacturer's Association (BHMA) A156 series for performance standards of the products referenced.

1.8 PRE-INSTALLATION CONFERENCE

A. Pre-installation conference is required, prior to commencing work of this Section, to determine Owner requirements for keying.

B. Schedule under provisions of Section 01 32 00.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually. Label and identify package with door opening code to match schedule.

B. Deliver keys to Owner by secure shipment direct from hardware supplier. Label and package keys individually for each door opening and provide in key cabinet.

C. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.10 MAINTENANCE

A. Provide manufacturer's maintenance services on door closers for one year from Date of Substantial Completion.

B. Provide special wrenches and tools applicable to each different or special hardware component.

1.11 PROJECT CONDITIONS

A. Whenever cutting and fitting is required to install hardware into or onto surfaces which are later to be painted or finished, coordinate removal, storage, and reinstallation with finishing work.

B. Do not install surface mounted items until finishes on the substrate have been completed.

1.12 EXTRA MATERIALS

A. Furnish 100 key blanks.

B. Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance, and removal and replacement of builders hardware.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. For each product, one of the listed manufacturers, where only one manufacturer is listed, no substitutions will be permitted.
   1. The first name manufacturer is the one whose product designation is used.

B. Butts and Continuous Hinges:
   1. Hager Hinge Company.
   2. Stanley Hardware.
   3. McKinney, ASSA ABLOY.

C. Locks and Latchsets:
   1. Best Locking Systems, Stanley Hardware.

D. Cylinders:
   1. Best Locking Systems, Stanley Hardware.

E. Exit Devices:
   1. Von Duprin, Allegion.

F. Overhead Closers:
   1. LCN Closers.
   2. Stanley Hardware.
   3. Yale Security, ASSA ABLOY

G. Stops and Bumpers:
   1. Hager.
   2. Rockwood Manufacturing Company.
   3. Glynn-Johnson.
   4. H.B. Ives.

H. Plates:
   1. Hager.
   2. Rockwood Manufacturing Company.
   3. H.B. Ives.

I. Overhead Stop and Holders:
   1. Glynn Johnson, Allegion.

2. Architectural Builders Hardware (ABH)

J. Magnetic Holders:
1. Rixson, ASSA ABLOY.

K. Thresholds, Door Stripping and Seals:
1. National Guard Product, Inc.
2. Reese Enterprises, Inc.
3. Zero International, Allegion.
4. Pemko, ASSA ABLOY.

L. Key Control Cabinet:
1. Telkey

M. Magnetic Holders:
1. Rixson; ASSA ABLOY

N. Automatic Operators:
1. Dorma Automatic.
2. Besam Operators.
3. Horton Automatics.

O. No substitutions, except under provisions of Section 01 63 00.

2.2 BUTTS AND CONTINUOUS HINGES

A. Butts: Unless otherwise indicated, BB1279, manufactured by Hager Hinge Company.
1. Provide non-removable pins for exterior doors and out-swinging corridor doors.

B. Provide 4-1/2 x 4-1/2 inch butts for doors not over 36 inches wide.
1. Provide 5 x 4-1/2 inch butts for doors over 36 inches wide.
2. Provide hinge of proper width where doors are indicated with 180 degree swing.

C. Provide one and one-half pair butts for each leaf.

D. Finish: US26D.

E. Continuous hinges: As scheduled, full mortise, heavy duty with bearing spacing 2 9/16” on centers.

F. Finish: Clear anodized aluminum, US28.

2.3 LOCKS AND LATCHSETS

A. Comply with ANSI A156.13, Series 1000, Grade 1 for exterior openings (and where scheduled for interior openings) and ANSI A156.2, Series 4000, Grade 1 for interior openings.

B. Exterior Locksets:
   1. Best Access “45H” Series.
   2. Provide 1 inch throw deadbolts.
   3. Solid cast lever design “14” with wrought “H” rose.

C. Interior Locksets:
   1. Best Access “93K” Series.
   2. Solid cast lever design with wrought rose, design “14C”.

D. Finish: US26D.

2.4 CYLINDERS AND KEYING

A. Provide manufacturer's interchangeable core housings keyed into an expansion of the existing Best Locking Systems for the University of Tennessee. Keyway shall be “Preminum”, patented keyway.

B. Supply all cylinders with temporary construction keying for use during building construction. Supply 24 construction keys.

C. At completion of project, the construction keying system shall be voided and permanent keys delivered directly to the Owner.

D. Finish: US26D.

2.5 EXIT DEVICES

A. Exit Devices: 99 series devices, manufactured by Von Duprin.
   1. Trim: 996L at lever operation.
   2. Function: As scheduled.

B. Finish: US26D.

2.6 OVERHEAD CLOSERS

A. Overhead Closers: The following manufactured by LCN.
   1. 4000 Series or 1460 Series as scheduled.
   2. Size in accordance with manufacturer's recommendations.
   3. Cast iron cylinder.

B. Provide drop bracket mounting for narrow top rail exterior doors and interior doors where required. Mount closers regular or parallel arm to mount cylinder body on room side of door away from public areas.

C. Provide the following:
   1. Separate adjustments for latch speed, general speed, and hydraulic back-check.
   2. Hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to minus 30 degrees F.
   3. Spring power adjustable to increase power.

D. Finish: Sprayed Aluminum.

2.7 STOPS AND BUMPERS

A. Stops: Provide 236W, manufactured by Hager Company where door stop is scheduled.
   1. Substitute No. 241F or 242F where wall mounted stop cannot be used.
   2. Brass, US26D finish.

B. Silencer: SR64, manufactured by H.B. Ives
   1. Provide 3 at single doors.
   2. Provide 2 at pairs of doors.

2.8 OVERHEAD STOPS AND HOLDERS

A. Provide types as scheduled.

B. Finish: US32D

2.9 PLATES

A. Kick Plates: 193S Series as manufactured by Hager Hinge Co.
   1. Stainless Steel with three (3) beveled edges.
   2. Height: 8 inches.
   3. Length:
      a. Single Doors: Nominal door width less 1 inch, except less 2 inches when plate is on push side.
      b. Double Doors: Nominal door leaf width less 1 inch.

B. Push and Pull Plates: As scheduled.

C. Finish: US32D.

2.10 DOOR STRIPPING, DRIP CAPS AND SEALS

A. Seals: As scheduled, manufactured by National Guard Products, Inc.

B. Finish: Clear Anodized

2.11 THRESHOLDS

A. Thresholds and Saddles: As scheduled, manufactured by National Guard Products, Inc.

B. Threshold shall be full masonry opening width, notched to frame profile.

C. Finish: Mill Finish Aluminum

2.12 KEY CONTROL CABINET

A. Furnish a Telkee Key Control System for project capacity, plus 50 percent, as manufactured by Telkee, Inc., Glen Riddle, Pennsylvania. The combination Hook and Label Pockets shall be solidly welded to the cabinet panels. The system shall include printed Key Gathering Envelopes; Reserve-Pattern Key Tags with self-locking key clip requiring no tools for assembly; Key Receipts and Receipt Holders; and three-part visible Key Index, Telkee, "AWC" Aristocrat, complete system.

2.13 MAGNETIC HOLDER

A. Provide magnetic holders as scheduled.

B. Magnetic holders shall be compatible with the building fire alarm system. Provide wiring information.

C. Finish: Sprayed Aluminum

2.14 AUTOMATIC OPERATORS

A. Provide automatic operators as scheduled that comply with BHMA A156.19; Power Assist and Low Energy Power Operators as manufactured by Dorma Automatics.

B. Where scheduled, provide operators that respond to signal from the access control system on the exterior side of door opening and shall have a stainless steel push button actuation from the inside. Units shall have an “ON/OFF” switch located on exterior of unit housing.

C. Provide operators mounted on the push side of opening.

D. Finish: To match aluminum storefront finish at aluminum storefront door and frame locations. US28, clear anodized aluminum finish at interior openings.

2.15 FASTENERS

A. Provide fasteners to suit conditions.
   1. Provide concealed fasteners for units which are exposed when the door is closed.
   2. Provide Phillips screws, except as otherwise indicated.

B. Provide exposed fasteners of finish to match the finish of the hardware item.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and

for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that doors and frames are of size and materials indicated on schedule.
   1. Verify door swings.
   2. Verify fire rating requirements.

C. Ensure that electric power of the proper characteristics is available to electric operated devices.

D. Verify that doors and frames are ready to receive work and dimensions are as indicated.

3.2 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions.

B. Use templates provided by hardware item manufacturer.

C. Drill and countersink fasteners for units which are not factory-prepared for anchorage fasteners.

3.3 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware to ensure proper operation or function.
   1. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.4 MAINTENANCE

A. After approximately six months occupancy, and within 10 days of notification by Architect, inspect the finish hardware installation, accompanied by the Supplier.
   1. Readjust each hardware item to restore proper function.
   2. Replace hardware items that have deteriorated or failed.
   3. Instruct Owner's personnel in recommended additions to the maintenance procedures.

3.5 PROTECTION

A. Protect installed materials from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where material is subject to abuse.

3.6 SCHEDULE

Set AL-1 - Each to Have:

2	Continuous Hinges	780-112-HD
1	Mullion	5654 x 2/154 Stabilizers
1	Exit Device	99DT
1	Exit Device	99NL

1	Cylinder	Best as required
1	Door Closer	4111-S-CUSH x 4110-18 Drop Plate
1	Automatic Operator	ED700 – Single Push Side Mounted
2	Push Buttons	59 Series
1	Threshold	425
2	Door Sweeps	200NA

Weatherstrip complete with aluminum doors and frames.
Building power for automatic operators, control wire and wiring by others.
Automatic Operators at Doors 101A, 192A and D01A only. Provide two (2) door closers at other doors.

Set AL-2 - Each to Have:

2	Continuous Hinges	780-112-HD
2	Sets Push/Pull Bars	159D
1	Door Closer	4111-S-CUSH x 4110-18 Drop Plate
1	Automatic Operator	ED700 – Single Push Side Mounted
2	Push Buttons	59 Series

Building power for automatic operators, control wire and wiring by others.
Automatic Operators at Doors 101B, 192C and D01B only. Provide two (2) door closers at other doors.

Set AL-3 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Exit Device	99NL
1	Cylinder	Best as required
1	Door Closer	4111-S-CUSH x 4110-18 Drop Plate
1	Threshold	425
1	Door Sweep	200NA

Weatherstrip complete with aluminum doors and frames.

Set AL-4 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Exit Device	99L–2 - 17 Lever (Double Cylinder)
2	Cylinders	Best as required
1	Door Closer	P1461
1	Door Stop	As required
1	Set Smoke Seal	5050 – Head & Jambs

Set AL-5 - Each to Have:

2	Continuous Hinges	780-112-HD
1	Mullion	5654 x 2/154 Stabilizers
2	Exit Devices	99DT
2	Door Closers	4111-S-CUSH x 4110-18 Drop Plate
1	Threshold	425
2	Door Sweeps	200NA

Weatherstrip complete with aluminum doors and frames.

Set AL-6 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Exit Device	22NL x 230NL
1	Cylinder	Best as required
1	Door Closer	4111-S-H-CUSH x 4110-18 Drop Plate
1	Threshold	425
1	Door Sweep	200NA

Weatherstrip complete with aluminum doors and frames.

Set AL-7 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Exit Device	99DT
1	Door Closer	4111-S-CUSH x 4110-18 Drop Plate
1	Threshold	425
1	Door Sweep	200NA

Weatherstrip complete with aluminum doors and frames.

Set AL-8 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Lever Office	93K-7-AB-14C
1	Door Stop	As required

Set AL-9 - Each to Have:

2	Continuous Hinges	780-112-HD
2	Flush Bolts	282D
1	Dust Proof Strike	280X
1	Deadlock	48H-7-R
2	Sets Push/Pull Bars	159D
2	Door Closers	P1461 x 1460-18 Drop Plate
2	Door Stops	As required

Set AL-10 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Lever Classroom	93K-7-R-14C
1	Door Closer	P1461 x 1460-18 Drop Plate
1	Door Stop	As required

Set 1 - Each to Have:

1	Continuous Hinge	780-112-HD
1	Exit Device	99NL
1	Cylinder	Best as required
1	Door Closer	4111-S-H-CUSH
1	Kick Plate	193S
1	Threshold	425
1	Door Sweep	200NA
1	Set Weatherstrip	127NA – Head & Jambs
1	Drip Cap	16A x M. O. Width

Set 2 - Each to Have:

2	Continuous Hinges	780-112-HD
1	Mullion	4954
1	Exit Device	99DT
1	Exit Device	99NL
1	Cylinder	Best as required
2	Door Closers	4111-S-CUSH
2	Kick Plates	193S
1	Threshold	425
2	Door Sweeps	200NA
1	Set Weatherstrip	127NA – Head & Jambs
1	Mullion Seal	5100N

Set 3 - Each to Have:

2	Continuous Hinges	780-112-HD
1	Mullion	KR4954
1	Exit Device	99DT
1	Exit Device	99NL
2	Cylinders	Best as required
2	Door Closers	4111-S-H-CUSH
1	Viewer	1756
2	Kick Plates	193S – 30” High
1	Threshold	425HD (0.244” thick)
2	Door Sweeps	200NA
1	Set Weatherstrip	127NA – Head & Jambs
1	Drip Cap	16A x M. O. Width
1	Mullion Seal	5100N

Set 4 - Each to Have:

4 ea.	Hinges	BB1191 – NRP (5” At Doors D34A, D33A)
1	Lever Storeroom	45H-7-D-14H
1	Overhead Holder	GJ70H Series
1	Threshold	884V
1	Set Weatherstrip	127NA – Head & Jambs
1	Drip Cap	16A x M. O. Width

Set 5 - Each to Have:

8 ea.	Hinges	BB1191 – NRP
1	Mullion	4954
1	Exit Device	99EO
1	Exit Device	99NL
1	Cylinder	Best as required
2	Door Closers	4111-S-H-CUSH
1	Threshold	425
2	Door Sweeps	200NA
1	Set Weatherstrip	127NA – Head & Jambs
1	Drip Cap	16A x M. O. Width
1	Mullion Seal	5100N

Set 6 - Each to Have:

4 ea.	Hinges	BB1279
1	Exit Device	99NL
1	Cylinder	Best as required
1	Door Closer	P1461
1	Door Stop	As required
3	Silencers	SR64

Set 7 - Each to Have:

3 ea.	Hinges	BB1168 (5” At doors over 3’0” width)
1	Exit Device	99L-F-17 Lever
1	Cylinder	Best as required
1	Door Closer	P1461/1461
1	Kick Plate	193S
1	Door Stop	As required
1	Set Fire Seal	9850 – Head & Jambs

Set 8 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Storeroom	45H-7-D-14H
1	Door Closer	1461
1	Kick Plate	193S
1	Door Stop	As required
1	Set Fire Seal	9850 – Head & Jambs

Set 9 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Classrm Security	93K-7-IN-14C
1	Door Closer	1461
1	Kick Plate	193S
1	Door Stop	As required
1	Set Fire Seal	9850 – Head & Jambs

Set 10 - Each to Have:

3 ea.	Hinges	BB1279
1	Exit Device	99L-F-17 Lever
1	Cylinder	Best as required
1	Door Closer	P1461
1	Kick Plate	193S
1	Door Stop	As required
1	Set Fire Seal	9850 – Head & Jambs

Set 11 - Each to Have:

4 ea.	Hinges	BB1279 (3 ea. Hinges at 7’2” Tall Doors)
1	Lever Classroom	93K-7-R-14C
1	Door Closer	1461/P1461
1	Kick Plate	193S
1	Door Stop	As required
3	Silencers	SR64 (Omit at wood fire doors)
1	Set Fire Seal	9850 – Head & Jambs at wood fire doors

Set 12 - Each to Have:

8 ea.	Hinges	BB1168 – 5”
1	Set Automatic Bolts	296W
1	Dust Proof Strike	280X
1	Lever Classroom	93K-7-R-14C
2	Door Closers	P1461 (1461-CUSH at Door 157B)
1	Coordinator	297D x 297F x Closer Mounting Brackets
2	Kick Plates	193S
2	Door Stops	As required (Omit at Door 157B)
1	Set Fire Seal	9850 – Head & Jambs
1	Set Fire Seal	9550 – Meeting Stiles

Set 13 - Each to Have:

3 ea.	Hinges	BB1279 (4 ea. At Doors Over 7’2”)
1	Lever Storeroom	93K-7-D-14C
1	Door Closer	P1461
1	Kick Plate	193S (16” High At Janitor’s Closets)
1	Door Stop	As required
1	Set Fire Seal	9850 – Head & Jambs

Set 14 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Classroom	93K-7-R-14C
1	Door Closer	P1461/1461
1	Kick Plate	193S
1	Door Stop	As required
1	Set Fire Seal	9850 – Head & Jambs

Set 15 - Each to Have:

6 ea.	Hinges	BB1279
1	Set Self Latching Bolts	294W
1	Dust Proof Strike	280X
1	Lever Classroom	93K-7-R-14C
1	Door Closer	P1461
2	Kick Plates	193S
2	Door Stops	As required
1	Set Fire Seal	9850 – Head & Jambs
1	Set Fire Seal	9550 – Meeting Stiles

Set 16 - Each to Have:

8 ea.	Hinges	BB1279
1	Set Automatic Bolts	296W
1	Dust Proof Strike	280X
1	Lever Storeroom	93K-7-D-14C
2	Door Closers	P1461
1	Coordinator	297D x 297F x Closer Mounting Brackets
2	Kick Plates	193S
2	Door Stops	As required
1	Set Fire Seal	9850 – Head & Jambs
1	Set Fire Seal	9550 – Meeting Stiles

Set 17 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Classrm Security	93K-7-IN-14C
1	Door Closer	1461/P1461
1	Door Stop	As required
1	Set Smoke Seal	5050 – Head & Jambs

Set 17A - Each to have same as Set 17 except 1 Set Fire Seal in lieu of 1 Set Smoke Seal:

Omit	Set Smoke Seal	5050 – Heads & Jambs
1	Set Fire Seal	9850 – Heads & Jambs

Set 18 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Storeroom	93K-7-D-14C
1	Door Closer	P1461 (1461-CUSH @ Doors 169A, 233A, 172A)
1	Door Stop	As required (Omit @ Doors w/1461-CUSH Closers)
1	Set Smoke Seal	5050 – Head & Jambs

Set 19 - Each to Have:

6 ea.	Hinges	BB1279
2	Exit Devices	9927EO-F-LBR
2	Door Closers	4040-SE
2	Kick Plates	193S
2	Door Stops	259H
2	Magnetic Holders	FM998
1	Set Smoke Seal	5050 – Head & Jambs
1	Set Smoke Seal	9550 – Meeting Stiles

Fire alarm power, relays, wire and wiring by others.

Set 20 - Each to Have:

6 ea.	Hinges	BB1279
1	Set Automatic Bolts	296W
1	Dust Proof Strike	280X
1	Lever Classrm Security	93K-7-IN-14C
2	Door Closers	1461
1	Coordinator	297D x 297F x Closer Mounting Brackets
2	Kick Plates	193S
2	Door Stops	As required
1	Set Smoke Seal	5050 – Head & Jambs
1	Set Smoke Seal	9550 – Meeting Stiles

Set 21 - Each to Have:

6 ea.	Hinges	BB1279
2	Exit Devices	9927L-F-17 Lever-LBR
2	Cylinders	Best as required
2	Door Closers	P1461
2	Kick Plates	193S
2	Door Stops	As required

1	Set Smoke Seal	5050 – Head & Jambs
1	Set Smoke Seal	9550 – Meeting Stiles

Set 22 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Office	93K-7-AB-14C
1	Door Closer	1461/P1461
1	Door Stop	As required
1	Set Smoke Seal	5050 – Head & Jambs

Set 23 - Each to Have:

3 ea.	Hinges	BB1279 (4 ea. At Doors Over 7’2”)
1	Lever Office	93K-7-AB-14C
1	Kick Plate	193S (At Doors D17A, D18A, D19A, 150A)
1	Door Stop	As required
3	Silencers	SR64

Set 24 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Privacy	93K-0-L-14C
1	Kick Plate	193S (At Doors 205A, 258A, 259A Only)
1	Door Stop	As required
3	Silencers	SR64

Set 25 - Each to Have:

3 ea.	Hinges	BB1279
1	Lever Passage	93K-0-N-14C
1	Door Stop	As required
3	Silencers	SR64

Set 26 – Not Used

Set 27 - Each to Have:

3 ea.	Hinges	BB1279 (4 ea. At Doors Over 7’2”)
1	Lever Storeroom	93K-7-D-14C
1	Overhead Holder	GJ450S Series
3	Silencers	SR64

Set 28 - Each to Have:

3 ea.	Hinges	BB1168
1	Exit Device	99L-BE-17 Lever
1	Door Closer	P1461
1	Kick Plate	193S
1	Door Stop	As required
3	Silencers	SR64
1	Set Smoke Seal	50505 – Head & Jamb (Door 204A Only)

Set 29 - Each to Have:

3 ea.	Hinges	BB1168 (4 ea. At Doors Over 7’2”)
1	Push Plate	30S – 8” x 16”

1	Pull Plate	H33G – 4” x 16” (2 ½” Clearance)
1	Door Closer	1461
1	Kick Plate	193S
1	Door Stop	As required
3	Silencers	SR64

Set 30 - Each to Have:

3 ea.	Hinges	BB1279 (4 ea. At Doors Over 7’2”)
1	Lever Classroom	93K-7-R-14C
1	Kick Plate	193S (Door 152A Only)
1	Door Stop	As required
3	Silencers	SR64

Set 31 - Each to Have:
Overhead coiling door hardware by manufacturer.

Set 32 - Each to Have:

6 ea.	Hinges	BB1279
2	Flush Bolts	282D
1	Dust Proof Strike	280X
1	Lever Office	93K-7-AB-14C
2	Door Stops	As required
2	Silencers	SR64

Set 33 - Each to Have:

4 ea.	Hinges	BB1168 – 5”
1	Lever Storeroom	93K-7-D-14C
1	Door Stop	As required
3	Silencers	SR64

Set 34- Each to Have:

3 ea.	Hinges	BB1168
1	Exit Device	99L-17 Lever
1	Cylinder	Best as required
1	Door Closer	P1461
1	Kick Plate	193S
1	Door Stop	As required
3	Silencers	SR64
1	Set Smoke Seal	5050 – Heads & Jambs (At Door 214A Only)

Set 35 – Not Used

Set 36 – Not Used

Set 37 – Not Used

Set 38 - Each to Have:

4 ea.	Hinges	BB1191
1	Lever Communicating	45H-7-G-14H
1	Door Closer	4111-S-H-CUSH
1	Threshold	884V
1	Set Weatherstrip	127SA – Head & Jambs
1	Drip Cap	16A x M. O. Width

Set 39 - Each to Have:

8 ea.	Hinges	BB1279
2	Flush Bolts	282D – 1/12” – 1/24”
1	Dust Proof Strike	280X
1	Lever Office	93K-7-AB-14C
2	Kick Plates	193S
2	Door Stop & Holders	495
2	Silencers	SR64

Set 40 - Each to Have:

4 ea.	Hinges	BB1279
1	Lever Privacy	93K-0-L-14C
1	Door Closer	1461
1	Kick Plate	193S
1	Door Stop	As required
3	Silencers	SR64

Set 41 - Each to Have:

4 ea.	Hinges	BB1279
1	Lever Classroom	93K-7-R-14C
1	Door Closer	P1461
1	Kick Plate	193S
1	Door Stop	As required
3	Silencers	SR64

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Windows.
   2. Doors.
   3. Glazed curtain walls.
   4. Glazed entrances.
   5. Interior borrowed lites.
   6. Storefront framing.
   7. Decorative Window Film

B. Related Sections include the following:
   1. Division 08 Sections "Mirrors" for unframed mirror units.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E1300, according to the following requirements:
      a. Specified Design Wind Loads: not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Buildings and Other Structures" Section 6.0 "Wind Loads."

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: For the following products, in the form of 12-inch- square Samples for glass.
   1. Each color of tinted float glass.
   2. Each color of spandrel glass.
   3. Insulating glass for each designation indicated.
   4. Decorative Window Film

C. Shop Drawings: glazing elevations shall include designation of tempered units as required by the Authorities Having Jurisdiction.

D. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS:

E. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: GANA's "Glazing Manual."
   2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
   3. IGMA Publication: SIGMA TM-3000 "Vertical Glazing Guidelines".
   4. IGMA Publication: SIGMA TB-3001 "Sloped Glazing Guidelines".

B. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
   1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

C. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
   1. Insulating Glass Certification Council (IGCC).
   2. Associated Laboratories, Inc. (ALI).
   3. National Certified Testing Laboratories (NCTL).

D. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

E. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:
   1. Primary glass of each (ASTM C1036) type and class indicated.
   2. Heat-treated glass of each (ASTM C1048) condition indicated.
   3. Insulating glass of each construction indicated.
   4. Laminated glass.

F. Installer: Installation shall be performed by a trained and qualified installer, specialized and experienced in application of window film required for this project.

G. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

H. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Division 01 Section "Project Meetings."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

A. The film product must remain in original plastic bag and boxes and have storage conditions as follows:

1. 40°F (5°C) - 90°F (32°C) storage temperature range
2. Out of Sunlight
3. Clean dry area
4. Original container
5. Do not stack boxes over six (6) units high. Excessive weight can damage the film
6. Handle products in accordance with manufacturer's instructions.
7. Total pre-installation shelf life: 2 years. Up to 2 years unprocessed, OR process within 1 year *and* apply within 1 year of processing

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

B. Confirm appropriate substrate is suitable for mounting of glass finish components prior to start of installation.

C. Apply materials when environmental conditions are within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s absolute limits. Application temperature range is from 53 to 100 degrees F (12 to 38 degrees C).

D. Environmental Limitations: Do not install until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 WARRANTY

A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Basis-of-Design Product: The design for each glazing product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
   2. Other acceptable manufacturer's include:
      a. PPG SolarBan 60
      b. Guardian Glass
      c. Viracon Glass

B. Window Film Manufacturers include but are not limited to :3M Company

2.2 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C1036, Type I (transparent flat glass), Quality-Q3; of class indicated.

B. Heat-Treated Float Glass: ASTM C1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. Roll Wave Maximum Distortion Tolerance: 0.003 inch target with 0.005 inch maximum peak to valley measurement.
   3. Bow and Warp Maximum Tolerance: 50 percent of the maximum allowed in ASTM C 1048.
   4. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
      a. Provide Kind HS (heat-strengthened) float glass at all spandrel units, unless tempered glass is required.
   5. For uncoated glass, comply with requirements for Condition A.
   6. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
   7. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is required by authorities having jurisdiction.

C. Ceramic-Coated Spandrel Glass: ASTM C1048, Condition B (spandrel glass, one surface ceramic coated), Type I (transparent flat glass), Quality-Q3, and complying with other requirements specified.
   1. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C1048.
   2. Spandrel glass using a silicone/water based elastomer opacifier (similar to ICD Opaci-Coat 300) will also be acceptable.

D. Sputter-Coated Float Glass: ASTM C1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.

E. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E2190 and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
   1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
      a. Provide Kind HS (heat-strengthened) float glass at all spandrel units, unless tempered glass is required.
   2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated or required by authorities having jurisdiction.
   3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
   4. Sealing System: Dual seal, with primary and secondary sealants as follows:
      a. Manufacturer's standard sealants.
   5. Spacer Specifications: Manufacturer's standard spacer material and construction.
   6. Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary sealants.
   7. Spacer: Manufacturer's standard spacer material and construction
   8. Desiccant: Molecular sieve or silica gel, or a blend of both.
   9. Fabrication Process: Utilize automated vertical insulating line for insulating glass unit assembly, sealing, and curing process.
      a. Edge Deletion: Delete low-E coating at perimeter prior to fabrication of insulating units according to coated glass manufacturer’s instructions.
      b. Sealant Uniformity Test: Perform IGMA Sealant Uniformity of Mix Test at least once per shift to verify proper mixing of secondary sealant. Documentation of testing shall be recorded and available upon Architect's request.
      c. Residual Moisture Test: Perform IGMA Residual Moisture Content by Head of Absorption Test. Perform test in accordance with desiccant manufacturer’s written recommendations.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
   1. EPDM, ASTM C864.
   2. Silicone, ASTM C1115.
   3. Thermoplastic polyolefin rubber, ASTM C1115.
   4. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C509, Type II, black; and of profile and hardness required to maintain watertight seal:
   1. EPDM.
   2. Silicone.
   3. Thermoplastic polyolefin rubber.
   4. Any material indicated above.

2.4 GLAZING MATERIALS

A. General:
   1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: One part non-acidic moisture curing neutral-curing silicone glazing sealant complying with ASTM C 920 Class A, Type S, Grade NS, Class 100/50, Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 790
      b. GE Advanced Materials - Silicones; SilPruf LM SCS2700
      c. Pecora Corporation; 890
      d. Tremco Incorporated; Spectrem 1
   2. Applications: High movement joints at metal-to metal and glass to metal.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 795
      b. GE Advanced Materials -Silicones; SilPruf NB SCS9000 or SilPruf SCS2000
      c. Pecora Corporation; 864
      d. Tremco Incorporated; Spectrem 2
   2. Applications: General applications in glazing installation subject to high movement including perimeter; use non-staining formula at absorbent perimeter applications.

D. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 799

b. GE AdvancedMaterials-Silicones; UltraGlaze SSG4000 or UltraGlaze SSG4000AC
c. Tremco Incorporated; Proglaze SSG or Tremsil 600

2. Applications: General applications in glazing installation including perimeter; use non-staining formula at absorbent perimeter applications.

E. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.

1. Color: As selected by Architect from manufacturer's full range of colors.
2. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; 995.
   b. GE Advanced Materials -Silicones; UltraGlaze SSG4000.
   c. Pecora Corporation; 896.
   d. Tremco Incorporated; Proglaze II.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.6 DECORATIVE WINDOW FILM

A. Design based upon 3M™ Fasara™ Glass and Plastic Finishes.

B. Material Properties include:

1. General: Glass and plastic finishes field-applied application to glass or plastic material as visual opaque or decorative film.
2. Film: Polyester
3. Decorative Pattern: Printed
4. Adhesive: Acrylic, Pressure Sensitive
5. Liner: Silicone-coated Polyester

6. Average Overall Thickness (Film and Adhesive without Liner): 80 microns (3.2 mils)

C. Fasara – Illumina-P Decorative / Privacy Glazing Film:
1. Ultraviolet Rejected (ASTM E 903): Not less than 99 percent.
2. Visible Light Transmission (ASTM E 903, ASTM E308): Not more than 66 percent.
3. Visible Light Rejected (ASTM E 903): Not less than 14 percent.
4. Solar Heat Reduction: Not less than 13 percent.

2.7 FABRICATN OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Grind smooth and polish exposed glass edges and corners.

2.8 MONOLITHIC FLOAT-GLASS UNITS

A. Glass Type MG#1: Clear annealed float glass.
1. Minimum Thickness: 6 mm.

B. Glass Type MG#2: Clear fully tempered float glass.
1. Minimum Thickness: 6 mm.
2. Application: Where safety glazing is required or indicated.

2.9 INSULATING-GLASS UNITS

A. Glass Type IG#1: High performance, low-E-coated, clear insulating glass.
1. Overall Unit Thickness: 1 inch.
2. Outdoor Lite: heat-strengthened float glass.
a. Minimum Thickness of Outdoor Glass Lite: 6 mm.
b. Low-E Coating: Sputtered on second surface.
c. Basis of Design Product: SolarBan60 on Clear.
3. Interspace Content: Air.
4. Indoor Lite: heat-strengthened float glass
a. Minimum Thickness of Indoor Glass Lite: 6 mm.
5. Winter Nighttime U-Value: 0.29.
6. Visible Light Transmittance: 70 percent minimum.
7. Solar Heat Gain Coefficient: 0.23 maximum.
8. Outdoor Visible Light Reflectance: 14 percent maximum
9. Safety glazing label where required.

B. Glass Type IG#2: High performance, low-E-coated, clear insulating glass.
1. Overall Unit Thickness: 1 inch.
2. Outdoor Lite: heat-strengthened float glass, and fully tempered float glass where safety glass as indicated.
a. Minimum Thickness of Outdoor Glass Lite: 6 mm.
b. Low-E Coating: Sputtered on second surface.

c. Basis of Design Product: SolarBan60 on Clear.
3. Interspace Content: Air.
4. Indoor Lite: Clear fully tempered float glass.
a. Minimum Thickness of Indoor Glass Lite: 6 mm.
5. Winter Nighttime U-Value: 0.29.
6. Visible Light Transmittance: 70 percent minimum.
7. Solar Heat Gain Coefficient: 0.23 maximum.
8. Outdoor Visible Light Reflectance: 14 percent maximum
9. Safety glazing label where required.

C. Glass Type IG#1S: High performance, low-E-coated, clear insulating spandrel glass.
1. Overall Unit Thickness: 1 inch.
2. Outdoor Lite: heat-strengthened float glass, and fully tempered float glass where safety glass is indicated.
a. Minimum Thickness of Outdoor Glass Lite: 6 mm.
b. Low-E Coating: Sputtered on second surface.
c. Basis of Design Product: SolarBan60 on Clear.
3. Interspace Content: Air.
4. Indoor Lite: heat-strengthened float glass and fully tempered float glass where safety glass is indicated.
a. Minimum Thickness of Indoor Glass Lite: 6 mm.
b. Opaque Coating: Ceramic coating on fourth surface
c. Basis of Design: SolarBan60
d. Manufacturer to provide samples from full range of manufacturer's color options-Architect to select.
5. Winter Nighttime U-Value: 0.29.
6. Safety glazing label where required.

D. Fire Resistant Clear: FRG#1, Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.

E. Fire Resistant Tempered: FRG#2; Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), uncoated, clear wire unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

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

C. Examine substrate(s) for compliance following manufacturer's recommendations for application of decorative film. Do not proceed with installation until unsatisfactory conditions have been corrected.

D. Reference 3M Technical Data Sheet to determine compatibility of finish to substrate prior to application of decorative film.

E. Scheduling of installation of film by Owner or its representative implies that substrate and conditions are prepared and ready for product installation per the recommendations of the installation specialist.

F. Proceeding with installation of film implies installer's acceptance of substrate and conditions.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Prior to installation of decorative film, thoroughly clean substrate of substances that could impair the overlay's bond, including mold, mildew, oil, grease.

C. Prior to installation of decorative film, re-clean surfaces with appropriate surface prep solvent and remove any haze or surface contamination.

3.3 GENERAL EXECUTION

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

K. Application of decorative window film
1. Application must be performed by qualified installer.
2. Do not proceed with installation until all finishing work has been completed in and around the work area.
3. Verify pattern prior to material acquisition.
4. Comply with manufacturer's installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
5. Install substrates with no gaps or overlaps. Form smooth, wrinkle-free, bubble-free surface for finished installation.
6. Remove air bubbles, wrinkles, blisters and other defects. Use approved procedures to prevent the formation of air bubbles, wrinkles, blisters and other defects.
7. Refer to the 3M Fasara Glass and Plastic Finishes Installation Guide for additional details.

3.4 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket

applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and spacers. Clean surfaces in accordance with manufacturer's recommendations.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Use cleaning methods recommended by architectural surfacing manufacturer for applicable environment.

F. Protect completed glass finish during remainder of construction period.

G. Consult with authorized installation specialist for project specifics

3.7 SCEDULE OF GLAZING

1. Typical View FG Unit
   a. 1/4" clear glass

2. Typical TG View Clear Tempered
   a. 1/4" clear glass

3. Typical View IG Unit
   a. 1/4" clear glass, Low E #2 surface
   b. 1/2" air space
   c. 1/4" clear glass

4. Typical View IGT Unit
   a. 1/4" clear glass, Low E #2 surface, fully tempered
   b. 1/2" air space
   c. 1/4" clear glass, tempered

5. Typical Spandrel SP
   a. 1/4" clear glass, Low E #2 surface, fully tempered
   b. 1/2" air space
   c. 1/4" clear glass, tempered

6. FR
   a. Laminated Structural Wire glass.

END OF SECTION 08 80 00

SECTION 08 88 13 - FIRE-RESISTANT GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Fire-protection-rated glazing.
   2. Fire-resistance-rated glazing.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product; 12 inches (300 mm) square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers.

B. Product Certificates: For each type of glass and glazing product, from manufacturer.

C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

A. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.

B. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
   2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.

2.5 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80.
   1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.

B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg F (250 deg C) temperature-rise limitation; and the fire-resistance rating in minutes.

C. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. InterEdge; Pyrobel.
      b. Pilkington North America Inc.; Pyrostop.
      c. Technical Glass Products; Pyrostop.
      d. Vetrotech Saint-Gobain; Contraflam.

2.6 FIRE-RESISTANCE-RATED GLAZING

A. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing according to ASTM E 119 or UL 263.

B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire-resistance rating in minutes.

C. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, ultraclear float glass; with intumescent interlayers; and complying with 16 CFR 1201, Category II.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. InterEdge; Pyrobel.
      b. Pilkington North America Inc.; Pyrostop.
      c. Technical Glass Products; Pyrostop.
      d. Vetrotech Saint-Gobain; SGG Contraflam.

2.7 GLAZING ACCESSORIES

A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.

B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 795.
      b. GE Advanced Materials - Silicones; SilGlaze II SCS2800.
      c. Tremco Incorporated; Spectrem 2.
   2. Colors of Exposed Glazing Sealants: Match Architect's samples.

C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
   2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.

B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop, so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial washaway from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
   1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 08 88 13

SECTION 09 22 00- PORTLAND CEMENT STUCCO

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. This section shall include all labor, material, and equipment to install new Portland cement plaster (stucco) on metal lath.

C. Provide zinc-coated fasteners in accordance with ASTM A153 for fasteners in fire retardant and pressure treated wood.

1.2 SUMMARY

A. This Section includes the following:
   1. Wall sheathing, gypsum and wood panel products.
   2. Parapet sheathing, inside face adjacent to roof, gypsum and wood panel products.
   3. Air Infiltration Barrier

B. Related Sections
   1. Division 04 Section "Unit Masonry" for concealed cavity wall flashing.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for the components and mixing ratios within each of the three (3) layers of cementitous materials.
   2. Include copies of warranties from chemical component manufacturers for each material.
   3. For building wrap, include data on air-/moisture-infiltration protection based on testing according to referenced standards.

1.4 ENVIRONMENTAL CONDITIONS

A. Do not begin plastering when there is any danger of the ambient temperature dropping to or below freezing.

B. Do not apply plaster to materials containing frost.

C. Do not allow plastering materials to drop below 50 degrees F for 48 hours after application.

D. On hot, dry, and/or excessively windy days, exercise extreme care during installation and curing operations to prevent rapid drying.

1.5 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be delivered in the manufacturer's original unopened packages.

B. Storage shall be in an enclosed shelter providing complete protection from exposure to the elements.

C. Any material that becomes damaged or deteriorated shall be promptly and completely removed from the premises of the work.

PART 2 - PRODUCTS

2.1 LATHING MATERIALS

A. Materials shall be of the material noted by USG, Milcor, or equal. Bases, grounds, and accessories shall be sized to suit cement plaster thickness.

B. Lath: self-furring or flat as required, standard galvanized diamond mesh, 3.4 pounds per square yard

C. Vertical Control Joint: No. 100, zinc

D. Horizontal Control Joint: 2 pieces consisting of casing bead over self-flashing cap, shop formed from zinc alloy sheet of 0.027 inch thickness as detailed on the Drawings.

E. Vertical Expansion Joint: back to back casing beads with caulked joint.

F. Casing Bead: No. 66, zinc

G. Outside Corner Reinforcement: No. 1, zinc

H. Drip Mold: At soffits, drip shall be an extruded aluminum drip screen 0.05 inch thick with a baked-on acrylic finish meeting FS TT-E-529, Class B, as detailed on the Drawings. At foundations, drip shall be shop formed from zinc alloy sheet 0.027 inch thick as detailed on the Drawings.

I. Lathing Channels: cold rolled, 16 gauge steel, galvanized or black asphaltum painted, 3/4 inch deep for furring channels and 1-1/2 inch deep for carrying channels.

J. Attachment: noncorroding fasteners as appropriate for the respective items and the building construction,

1. 1.Lath Tie Wire: minimum No. 18 gauge galvanized wire
2. 2.Supplemental Lath Attachment: S-12 buglehead screws with suitable washer
3. 3.Furring Tie Wire: minimum No. 16 gauge galvanized annealed wire

4. 4.Hanger Wire: minimum No. 9 gauge galvanized

2.2 BASE COAT PLASTER

A. Portland cement lime plaster.

B. Cement: ASTM C150, Type 1 portland cement

C. Lime: Bond Crete, Mortaseal mason's lime, or equal

D. Aggregate: white silica sand passing 20 mesh screen, ASTM C35

2.3 FINISH COAT PLASTER

A. A commercially mixed and sanded portland cement exterior finish plaster mix that is suitable for job addition of water only. Mix shall be factory tinted white.

2.4 WATER: Potable

2.5 MIXES

A. Base Coat: Mix lime, portland cement, and sand in accordance with ANSI A42.2, Type L.
   1. Scratch Coat: 1 bag portland cement, 3/4 bag lime, and 5 to 6 cubic feet of sand
   2. Brown Coat: 1 bag portland cement, 1 bag lime, and 6 to 7 cubic feet of sand

B. Finish Coat: Mix stucco with water according to the manufacturer's specifications

PART 3 - EXECUTION

3.1 LATHING MATERIALS

A. Fur to walls and to structural members or suspend lathing from same according to the conditions indicated on the Drawings.
   1. For suspended applications, attach hangers to structural members at 3 feet 6 inches maximum spacing along the carrying channels by wrapping around the structural member or by attaching with approved mechanical devices.
   2. Space carrying channels at 3 feet 6 inches maximum on center to conform to ceiling lines. Channels shall not be restrained against any abutting surfaces such as walls, columns, etc.
   3. Space furring channels at right angles along carrying channels at 1 foot 4 inches maximum on center unless otherwise noted on the Drawings. Tie at each crossing with 2 strands of the indicated fastener.
   4. Attach lath with the long dimension across the furring at 6 inches on center along each furring channel. End laps shall be a minimum of 1 inch and shall occur over furring channels. Side laps shall be a minimum of 1/2 inch. Tie side laps together at a minimum of 9 inches on center.

5. Install corner reinforcement at all outside corners. Where plaster abuts other materials and intersecting surfaces, install casing beads. Space casing away from abutting surfaces sufficiently to allow for caulking joint.
6. Exterior horizontal surfaces shall have control joints spaced at 10 feet in either direction. Break lath and furring and carrying channels at control joints. Position joints to intersect light fixtures, vents, etc.

3.2 BASE COAT

A. Mix base coat materials by hand or in a mechanical mixer to a uniform consistency. Apply in two coats with enough material to provide a total thickness of 3/4 inch with the finish coat. Reference structural drawings for additional fastening requirements.

B. Apply scratch coat with enough pressure to form good full keys to the lath, and then cross rake. After setting, damp cure for 48 hours.

C. Apply brown coat (second coat), bring out to grounds, and straighten to a true surface with rod and darby without the use of additional water; leave rough to receive finish coat. After setting, damp cure for 48 hours and then allow to dry as long as possible before applying finish coat but no less than 5 days.

3.3 FINISH COAT

A. Mix stucco with water only. Hoe stucco into water, and allow to soak 15 minutes before mixing. Mix thoroughly to a smooth consistency. Mix each batch the same length of time to ensure uniformity. Use no mix over 3 hours old.

B. Water spray base coat to a uniform dampness and remove loose projecting particles. Apply stucco well ground into base and double back to a uniform thickness of 1/8 inch, covering total area between edges, grounds, etc., in 1 operation to eliminate joints. Trowel 3 to 4 times before finishing.

C. Float finish using the same type of float used to prepare sample. Float sufficiently to bring aggregate to the surface to a uniform texture free of slick spots and other blemishes. Use no water in floating.

D. Fog spray surface for 3 days after setting.

3.4 COMPLETION

A. Point up around trim and other work. Cut out and patch defective areas to match adjacent areas.

B. Clean up all plaster from metal beads, screeds, and trim. Remove plaster from adjacent surfaces and remove equipment and excess material and debris.

END OF SECTION 06 16 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes non-load-bearing steel framing members for the following applications:
   1. Interior walls and suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

B. Related Sections include the following:
   1. Section 09 29 00 - Gypsum Board.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
   1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements indicated in drawings.
   2. Rated assemblies to be substantiated, from applicable testing using the proposed products, by Contractor.
   3. Both metal framing and gypsum board manufacturers must submit written confirmation that they accept the other manufacturer's product as a suitable component in the assembly. Acceptance is as follows:
      a. If installation of both products is proper, no adverse effect will result in the performance of one manufacturer's product by the other's products.
      b. Combining products can be substantiated by required assembly tests.

B. STC-Rated Assemblies (if required): For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C645 requirements for metal, unless otherwise indicated.
   2. Comply with ASTM C645; roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 (Z120) or having a coating that provides equivalent corrosion resistance..

2.2 SUSPENSION SYSTEM COMPONENTS

A. Tie Wire: ASTM A641, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

B. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
   1. Depth: 1-1/2 inches.

C. Suspended T-grid type: heavy duty performance per ASTM C635, galvanized, nominal 1 inch wide face dimension, (face knurled or dimpled), nominal 1-1/2 inch depth. Provide edge and perimeter trim as required. Acceptable manufacturers include, but are not limited to:
   1. BPB America / Celotex
   2. Chicago Metallic
   3. United States Gypsum (USG)

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C645.
   1. Minimum Base-Metal Thickness:
      a. Plain: 0.027 inch (27 mil)
      b. Dimpled: 0.020 (20 mil)
   2. Depth: 3-5/8 inch typical, or 1-5/8, 2-1/2, 6, 8 or other as indicated on drawings.

B. Hat-Shaped, Rigid Furring Channels: ASTM C645.
   1. Minimum Base Metal Thickness: 0.0179 inch (18 mil).
   2. Depth: 7/8 inch, unless indicated otherwise.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

B. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.
   1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Provide wind uplift bracing where system may be exposed to wind forces, such as exterior soffits and interior vestibules.

D. Suspend hangers from building structure as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
   a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
3. Do not attach hangers to steel roof deck.
4. Do not connect or suspend steel framing from ducts, pipes, or conduit.

E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.
   1. Space studs as follows, maximum spacing:
      a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
      b. Multilayer Application: 16 inches o.c., unless otherwise indicated.
      c. Tile backing panels: 16 inches o.c., unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
   1. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb, unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   2. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
   3. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
   4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

D. Direct Furring:
   1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced maximum 24 inches o.c.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Interior gypsum board.
   2. Trim and accessory materials.

B. Related Sections include the following:
   1. Division 07 Section "Joint Sealants" for acoustic and general use sealants.
   2. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board.
   3. Division 09 Section "Painting" for primers applied to gypsum board surfaces.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Include Volatile Organic Compound information for material and adhesive.

1.4 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

1.5 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those

that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C1396, as applicable to type of gypsum board indicated and whichever is more stringent.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. USG Corporation.
      b. CertainTeed Gypsum.
      c. Georgia Pacific Gypsum.
      d. National Gypsum Company.
   2. VOC content of adhesive (50 g/L less water).

B. Regular Type:
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

C. Type X:
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

D. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

E. Moisture and Mold-Resistant Type (Tile Backer Board): With moisture- and mold-resistant core and surfaces complying with ASTM C1178 and ASTM D3273.
   1. Core: 5/8 inch, Type X.
   2. Long Edges: Tapered.

F. Abuse Resistant Type: 5/8 inch thick, long edges tapered, with moisture and mold-resistant core and surfaces.
   1. CertainTeed Gypsum, ProRoc Moisture and Mold Resistant Extra Abuse Type X with M2Tech.
   2. Georgia Pacific, Dens Armor Plus.
   3. Lafarge, Protecta AR 100.
   4. National Gypsum, Hi-Abuse XP Wallboard.
   5. United States Gypsum (USG), Fiberock Aqua Tough.

2.3 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

A. Exterior Gypsum Soffit Board: ASTM C1396, with manufacturer's standard edges.
   1. Core: 5/8 inch.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.
   1. Material: Galvanized.
   2. Shapes:
      a. Cornerbead.
      b. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      c. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Fry Reglet Corp.
      b. Gordon Interior Specialties, Inc.
      c. Pittcon Industries.
   2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.
   3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.
   4. Reveal: Fry Reglet Soffit "Z" Reveal DRMZ-625-75, clear anodized aluminum.
   5. Light Cove: Gordon Interior Specialties, Inc., model 1096.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475.

B. Joint Tape:
   1. Interior Gypsum Wallboard: Paper.
   2. Exterior Gypsum Board Panels: fiberglass mesh tape.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type, compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: for Second coat use drying-type, all-purpose, compound.
   4. Finish Coat: Use all-purpose, drying type, all-purpose, compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C1002, unless otherwise indicated.
   1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
   2. Provide galvanized screws at tile backer panels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

G. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Regular Type: As indicated on Drawings.
   2. Type X: Where required for fire-resistance-rated assembly.
   3. Ceiling Type: Ceiling surfaces.
   4. Moisture- and Mold-Resistant Type: At toilet rooms.

B. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and with long dimension at right angles to framing, unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
      b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
   3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners, unless otherwise indicated.
   2. U-Bead: Use where indicated.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
   1. Level 5: At panel surfaces that will be exposed to view, unless otherwise indicated.
      a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.6 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
   1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
   2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
      a. Installation of 80 percent of lighting fixtures, powered for operation.
      b. Installation, insulation, and leak and pressure testing of water piping systems.
      c. Installation of air-duct systems.
      d. Installation of air devices.
      e. Installation of mechanical system control-air tubing.
      f. Installation of ceiling support framing.

3.7 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Porcelain ceramic floor, base and wall tile.

B. Extent of tile work is indicated on drawings and schedules.

C. Related Sections include the following:
   1. Section 03 30 00 - Cast-in-Place Concrete, for monolithic slab finishes specified for tile substrates.
   2. Section 07 92 00 - Joint Sealants, for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
   3. Section 09 20 00 - Gypsum Board, for tile backing panels.
   4. Division 22 Sections for plumbing fixtures and fittings.

1.3 DEFINITIONS

A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C499) plus joint width indicated.

B. Face Size: Actual tile size, excluding spacer lugs (minor facial dimension as measured per ASTM C499).

C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.4 SUBMITTALS

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

B. Samples for Initial Selection Purposes: Submit manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.

C. Samples for Verification Purposes: Submit the following:
   1. Samples for each type of tile and for each color and texture required, not less than 12 inches square, on plywood or hardboard backing and grouted.
   2. Full size samples for each type of trim, accessory and for each color.
   3. Samples of metal edge strip.
   4. Include Volatile Organic Compound information for tile and adhesive.

D. Certification: Furnish Master Grade Certificates for each shipment and type of tile, signed by manufacturer and Installer.

E. Certified Test Reports: Submit certified test reports from a qualified independent testing laboratory evidencing compliance of tile and tile setting products with requirements specified based on comprehensive testing of current products. Include in reports testing laboratory's interpretation of test results relative to specified requirements.

F. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

1.5 QUALITY ASSURANCE

A. Tile flooring materials shall comply with the Americans with Disabilities Act Design Guidelines recommendations for slip resistance on both flat and ramped surfaces.

B. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.
   1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

C. Interior Finish Classification: All interior wall or ceiling finishes shall be classified as Class A, Class B, or Class C, as based on the results from NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials. Classification shall be clearly identified on all submittal information associated with products of this specification.

D. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

E. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
   1. Waterproofing membrane.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

C. Maintain temperatures at not less than 50 degrees.F in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
   2. Products: Subject to compliance with requirements, provide one of the products specified.
   3. Basis-of-Design Product: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
   4. Reference Finish Schedule sheet for specific product selections.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements.
   2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
   3. VOC content of adhesive (65 g/L less water)

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific

products or materials complying with the following requirements:

1. As selected by Architect from manufacturer's full range.
2. Actual patterns shall be provided by the Architect for each area prior to installation.
3. Provide tile trim and accessories that match color and finish of adjoining flat tile.

D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

A. Ceramic/Porcelain Tile:
1. Composition: Vitreous or impervious natural clay or porcelain.
2. Nominal Thickness: 5/16 inch.
3. Provide base and trim pieces as indicated on the drawings.
4. Reference Room Finish Legend and Room Finish Schedule for styles, colors and sizes.

2.4 SETTING AND GROUTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
1. Cleavage Membrane: Asphalt felt, ASTM D226, Type I (No. 15); or polyethylene sheeting, ASTM D4397, 4.0 mils (0.1 mm) thick.
2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A185 and ASTM A82 except for minimum wire size.
3. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed Portland cement and aggregate mortar bed.

B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
1. For wall applications, provide nonsagging mortar that complies with Paragraph C-4.6.1 in addition to the other requirements in ANSI A118.1.

C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.

a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

D. Sand-Portland Cement Grout: Provide materials complying with ANSI A108.10 and of color required to match architect's sample.

E. Latex-Portland Cement Grout: Provide product complying with ANSI A118.6 for the following composition and of color indicated:
1. Prepackaged dry grout mix incorporating dry polymer additive in the form of a re-emulsifiable powder to which only water is added at job site.
2. Application: Use to grout joints in glazed wall tile and ceramic mosaic floor tile unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

A. Metal Edge Strips: Zinc alloy or stainless steel terrazzo strips, with integral provision for anchorage to mortar bed or substrate, unless otherwise indicated.

B. Trowelable Underlayments and Patching Compounds (if required): Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.6 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

3.2 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Waterproofing Membrane: apply to floor and walls of tile showers. Apply in accordance with manufacturers written instructions. Apply in two coats, wet film thickness of 0.5 mm to 0.8 mm per coat. Allow first coat to dry to touch before applying second coat. Use wet film thickness gage to spot check coated areas.

D. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 WATERPROOF MEMBRANE INSTALLATION

A. Clean substrate and install membrane in accordance with the manufacturer's written instructions and recommendations.

B. Install membrane at showers, full height of walls. Install in two coats to nominal 40 - 50 mil thickness, or as recommended by the manufacturer. Provide reinforcing fabric at corners and other locations as recommended by the manufacturer.

C. Provide backer rod and suitable sealant at junctions of surfaces, pipe penetrations and similar conditions.

3.4 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Reference drawings for layout and tile pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

F. Grout tile to comply with requirements of the following tile installation standards:
   1. For ceramic tile grouts (sand-Portland cement; dry-set, commercial Portland cement; and latex-Portland cement grouts), comply with ANSI A108.10.

3.5 LAYOUT

A. Determine locations of all movement joints before starting tile work.

B. Lay out all tile work so as to minimize cuts less than one-half tile in size.

C. Locate tile cuts in both walls and floors so as to be least conspicuous.

D. Lay out tile wainscot height to next full tile beyond dimensions shown.

E. Align all wall joints to give straight uniform grout lines, plumb and level.

F. Align floor joints to give straight uniform grout lines, parallel with walls.

G. Align floor joints with wall/base joints where tile have a common dimension.

H. Movement Joints:
   1. TCA-2011 pg 271
   1. Provide movement joints in tile at locations specified or as indicated on plans in floor material to receive tile.
   2. Provide movement joints at all inside corners.

3.6 WORKMANSHIP

A. Supply first-class workmanship in all tile work.

B. Use all products in strict accordance with recommendations and directions of manufacturers.

C. Proportion all mixes in accordance with latest ANSI Standard Specifications.

D. Smooth all exposed cut tile edges.

E. Be sure cut tile edges are clean before installing.

F. Fit tile carefully against trim and around pipes, electric boxes and other built-in fixtures so that escutcheons, plates and collars will completely overlap cut edges.

G. Be sure all tile work is free of grout film upon completion.

3.7 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
   1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
      a. Tile floors in wet areas.

B. Joint Widths: Install tile on floors with joint widths complying with floor pattern layout drawings.

C. Install sealant joints.

3.8 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on floors with joint widths complying with wall tile pattern layout drawings.

C. Coved tile base: Install coved tile base flush with floor tile. Do not install coved tile base on top of floor tile. Install sealant between coved base and floor tile at perimeter of all rooms.

3.9 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.10 FLOOR TILE INSTALLATION METHODS

A. Tile Installation: Interior floor installation on concrete; thin-set mortar; TCA F113 and ANSI A108.5.
   1. Tile Type: reference Finish Schedule.
   2. Thin-Set Mortar: Dry-set or Latex- Portland cement mortar.
   3. Grout: Epoxy grout.

3.11 WALL TILE INSTALLATION METHODS

A. Tile Installation: interior wall installation over masonry or concrete; thin-set mortar; TCA W202-I and ANSI A108.5.
   1. Tile Type: porcelain ceramic tile.
   2. Thin-Set Mortar: Dry-set or Latex- Portland cement mortar.
   3. Grout: Epoxy grout.

END OF SECTION 09 30 00

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Acoustical panels and exposed suspension systems for ceilings.
   2. Acoustic Metal Ceiling and suspension system for ceilings.

1.3 RELATED SECTIONS

A. Division 09 – Gypsum Board
B. Division 23 – HVAC
C. Division 26 – Electrical

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
   2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
   3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
   4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
   5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
   6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
   7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
   8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
   9. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
   10. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
   11. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
   12. ASTM E 1264 Classification for Acoustical Ceiling Products

B. International Building Code; refer to code review drawing.

C. ASHRAE Standard 62 1 2004 Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

1.5 SUBMITTALS

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

B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Ceiling suspension system members.
   2. Method of attaching hangers to building structure.
   3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
   4. Minimum Drawing Scale: 1/8 inch = 1 foot.

C. Samples for Initial Selection: For components with factory-applied color finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
   1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
   2. Concealed Suspension System Members, Moldings, and Trim: Set of 12- inch- long Samples of each type, finish, and color.
   3. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

F. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

G. Maintenance Data: For finishes to include in maintenance manuals.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions

are maintained at the levels indicated for Project when occupied for its intended use.

1.7 DELIVERY STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
   1. Acoustical Panels: Sagging and warping
   2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:
   1. Acoustical Metal panels: One (1) year from date of substantial completion
   2. Grid: One (1) year from date of substantial completion

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.9 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
   1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in

which face of test specimen is 15-3/4 inches away from test surface per ASTM E795.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273 and evaluated according to ASTM D3274 or ASTM G21.

D. Reference Room Finish Legend for acoustical ceiling panel selections.

E. Decorative Panel Ceiling: Type AMP-1 Provide manufacturer's standard panels of configuration size as indicated that comply with the following conditions unless otherwise noted:
1. Edge Profile: Square 15/16IN for interface with Prelude XL 15/16" Exposed Tee grid.
2. Perforation Option: Round - Straight
3. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.75
4. Ceiling Attenuation Class (CAC) :
5. Sabin: N/A
6. Articulation Class (AC):
7. Flame Spread: ASTM E 1264; Class A
8. Light Reflectance White Panel: ASTM E 1477; 0.61
9. Dimensional Stability: Standard
10. Recycle Content: Post-Consumer - 60% Pre-Consumer Waste - 30%
11. Acceptable Product: MetalWorks Capz, as manufactured by Armstrong World Industries
12. Color and style to be selected from the manufacturer’s full line of options.

2.2 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C635.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
1. High-Humidity Finish: Comply with ASTM C635 requirements for "Coating Classification for Severe Environment Performance" at areas to receive clean room ceiling panels.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

D. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face

of test specimen is 15-3/4 inches away from test surface per ASTM E795
MetalWorks CAPZ

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
   1. Zinc-Coated, Carbon-Steel Wire: ASTM A641, Class 1 zinc coating, soft temper.
   2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized steel sheet complying with ASTM A653, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

2.3 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

A. Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A653, not less than G30 coating designation, with prefinished metal caps on flanges.
   1. Structural Classification: Intermediate-duty system.
   2. Face Design: Flat, flush.
   3. Cap Material: Steel or aluminum cold-rolled sheet.
   4. Cap Finish: color as indicated in Room Finish Legend / Room Finish Schedule.
   5. Face dimension: 15/16 inches unless indicated otherwise.

B. Clean Room Grid: 15/16 inch, with co-extruded gasket grid system. Armstrong Clean Room grid system for use with Clean Room ceiling panels.

2.4 METAL SUSPENSION SYSTEM FOR DECORATIVE METAL PANELS

A. Components
Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   1. Structural Classification: ASTM C 635 Heavy Duty
   2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
   3. Recycle Content: Post-Consumer - 50% Pre-Consumer - 11%
   4. Acceptable Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices:
Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties:
ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Accessories

1. Follow manufacturer's requirements for all necessary components required for installation of specified system.

a. 6091 - Safety Cable
b. 7126 - Spreader Hold Down
c. 7127 - Snap-in Access Tool
d. 7445 - Stabilizer Bar
e. ARBRKT - Adjustable Hanger Bracket
f. ARSTUD - Threaded Stud
g. ES4 - Expansion Sleeves (for 15/16")
h. SH12 - Support Hanger

2.5 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

B. Trim Channel: Armstrong 4 inch Axiom perimeter trim channel.

1. Refer to reflected ceiling plan drawings for locations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half- width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   6. Do not attach hangers to steel deck tabs.
   7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
   9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in- place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
   2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
   1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

2. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. After installation of the ceiling grid and lights but prior to installation of ceiling panels, notify Architect to allow observation of areas above the ceiling grid, including completed fire stopping of rated wall and smoke wall penetrations.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 00 - RESILIENT FLOORING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Resilient Vinyl Composition Tile.
2. Rubber Tile.
3. Rubber stair treads.
4. Resilient Base and Accessories.
5. Resilient Linoleum Tile Flooring.

B. Related Sections include the following:
1. Section 03 30 00 - Cast-in-Place Concrete, flooring substrates.

1.3 REFERENCES

A. ASTM International:
1. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
2. ASTM D2047 Standard test method for static coefficient of friction of polished-coated floor surfaces as measured by the James Machine.
3. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
4. ASTM F710 - Standard practice for preparing concrete floors to receive resilient flooring.
5. ASTM F1869 - Standard test method for measuring vapor emission rate of concrete subfloor using anhydrous calcium chloride.
6. ASTM F1861 - Standard Specification for Resilient Wall Base.

B. Federal Specification Unit:
1. FS L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll), with Backing.

C. National Fire Protection Association:
1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.4 SUBMITTALS

A. Shop Drawings: Indicate seaming plan, custom patterns and inlay designs and self-coving base detail.

B. Product Data: Submit data describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

1. Include Volatile Organic Compound information for carpet and adhesive.

C. Samples:
1. Submit manufacturer's complete set of color samples for initial selection.
2. Submit two samples, 12 x 12 inches in size for sheet material and actual tile size for tiles, illustrating color and pattern for each resilient flooring product specified.

D. Shop drawings shall include the following note completed and signed by the Contractor:
THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

F. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread ratings and has been tested and meets or exceeds indicated standards.

G. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

H. Replacement Materials: After Completion of work, deliver to the project site replacement materials from same lot as materials installed as follows:
1. Tile Flooring: Not less than 50 square feet of each type, pattern and color installed.
2. Resilient base: not less than 10 linear feet for every 500 linear feet of each different type and color.

1.5 QUALITY ASSURANCE

A. Resilient flooring materials shall comply with the Americans with Disabilities Act Design Guidelines recommendations for slip resistance on both flat and ramped surfaces.

B. The flooring sub-contractor shall have completed at least 5 projects of similar size and scope, utilizing materials specified and must provide project reference details. Resilient sheet flooring installer shall be approved in writing by the flooring manufacturer.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

C. ASTM F2170-02 Standard Test Method for Determining Relative Humidity in

Concrete Floor Slabs using Probes and or ASTM F1869-98 Standard Test Method for Measuring Moisture Vapor Emissions Rate for Concrete Sub-Floor Using Calcium Chloride.

1. The relative humidity measured from the center of the concrete slab should not exceed 75% or 5 lbs per 1,000 square feet in 24 hrs. If the test results exceed the limitations, the installation must not proceed until the problem is corrected.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Whenever a product is specified by using a proprietary name or the name of particular manufacturer or vendor, the specific item mentioned shall be understood as establishing type, function, dimension, appearance and quality desired. Other manufacturers offering comparable products may be considered.

2.2 RESILIENT BASE

A. Manufacturers:
   1. Roppe Corp. Model.

B. Base: ASTM F1861 Rubber; top set coved:
   1. Height: 4 inch.
   2. Thickness: 0.125 inch thick.
   3. Finish: Matte.
   4. Length: Roll.
   5. VOC content of adhesive (50 g/L less water)

2.3 VINYL COMPOSITION TILE FLOORING

A. Manufacturers:
   1. To be determined.

B. Vinyl Composition Tile: Refer to Finish Schedule for color and pattern selections.
   1. ASTM F1066:
   2. Thickness: 0.125 inch.
   3. VOC content of adhesive (50 g/L less water)

2.4 RUBBER TILE FLOORING

A. Rubber Flooring Tile: nominal 27 x 27 inches, 3/8 inch thick, interlocking tile.

1. ROPPE Tuflex Spartus, color to be selected.
2. VOC content of adhesive (60 g/L less water)

2.5 LINOLEUM TILE

A. Forbo Flooring Systems Marmoleum Tile: 20 x20 2.5mm thick
1. ASTM E-682/ NFPA 258-450 Homogeneous linoleum floorcovering shall be made of primarily natural materials consisting of linseed oil, wood flour, rosin binders, and dry pigments mixed and calendared using a 2 layer process onto a polyester back to ensure optimum dimensional stability and castor resistance backing including a strong durable primer and a top layer ensuring a highly effective shield against dirt.
2. VOC content of adhesive (50 g/L less water)

2.6 RUBBER STAIR TREADS

A. Integral tread/riser: raised circular design, square nose, tread with contrasting striping for the visually impaired. Provide matching tile for landings. Colors for tread, striping and tiles to be selected. Manufacturers offering acceptable products include;
1. Burke Flooring Products: Uni-Step, Round Profile, Visually Impaired.
2. Johnsonite: VIRTR-RD.
3. Roppe: Style 96, Raised Circular Vantage.
4. VOC content of adhesive (50 g/L less water)

2.7 ACCESSORIES

A. Subfloor Filler: Premix latex; type recommended by adhesive material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Moldings and Edge Strips: Same material as flooring. Provide profile as required to form smooth transition between materials.

D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine to ensure satisfactory substrate surfaces. Satisfactory means smoothand free from cracks, holes, ridges, and coatings preventing adhesive bond, detrimental moisture vapor emissions and other defects impairing performance or appearance.

B. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified

and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Verify floor and lower wall surfaces are free of substances capable of impairing adhesion of new adhesive and finish materials.

D. Moisture vapor emission from the substrate shall not exceed 3 pounds per 1,000 square feet per 24 hour period for rubber flooring; or 5 pounds per 1,000 square feet per 24 hour period for vinyl composition tile, in conformance with ASTM F1869.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is cured.

C. Clean substrate.

D. Apply primer as required to prevent "bleed-thru" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions applicable to products and application indicated.

3.4 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

B. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

C. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.

D. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

3.5 INSTALLATION - BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.6 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and maintain resilient flooring products.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

3.8 PROTECTION

A. Protect installed materials from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where material is subject to abuse.

END OF SECTION 09 65 00

SECTION 09 67 16 – EPOXY TERRAZO FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Pre-Cast epoxy terrazzo flooring and base including preparation of substrates.

B. Related Sections:
   1. Division 03 Cast In Place Concrete.
   2. Division 04 Unit Masonry.
   3. Division 05 Metal Stairs.
   4. Division 07 Below-Grade Vapor Retarder/Barrier.
   5. Division 07 Joint Sealants.
   6. Division 09 Painting and Coating.

1.3 SUBMITTALS

A. Manufacturer's product data for each type of terrazzo and accessory. System will be evaluated on the basis of standards. For tests not listed in published data, manufacturer shall supply missing data according to referenced standard.
   1. Physical properties.
   2. Performance properties.
   3 Specified Tests
   4. Material Safety Data Sheet.
   5. Manufacturer's standard warranty.

B. Shop Drawings. Include terrazzo installation requirements. Include plans, elevations, sections, component details and attachments to other work. Show layout of the following:
   1. Divider strips.
   2. Control and expansion joint strips.
   3. Base and border strips.
   4. Abrasive strips.
   5. Stair treads, risers and landings.
   6. Pre-cast terrazzo jointing and edge configurations including anchorage details.
   7. Terrazzo patterns.

C. Samples for initial selection from Terrazzo & Marble Supply color plates showing the full range of colors and patterns available for each terrazzo type indicated.

D. Samples for Verification: Match architect's samples for each type, material, color and pattern of terrazzo and accessory required showing the full range of color, texture and pattern variations expected. Label each terrazzo sample to identify Manufacturer Resin System's matrix color and aggregate types, sizes and proportions. Prepare samples of same thickness and from same material to be used for the work in size indicated below:
   1. Epoxy terrazzo: Minimum 6" x 6" (152.4 mm x 152.4 mm) sample of each color and type of terrazzo.

2. Precast epoxy terrazzo: Minimum 6” x 6” (152.4 mm x 152.4mm) sample of each color and type of terrazzo.
3. Accessories: 6” length (152.4 mm) of each kind of divider strip, stop strip and control joint strip required.
4. Stair Treads: 12” length (304.8 mm) wide sample combination tread/riser with cast-in nosing.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Manufacturer shall be an associate member of NTMA.
   2. Engage an epoxy manufacturer with at least ten (10) years experience in the manufacture of epoxy flooring materials.

B. Installer Qualifications:
   1. Installer shall be a contractor member of NTMA.
   2. Installer shall be certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.

C. Source Limitations:
   1. Obtain primary Epoxy Terrazzo Flooring System materials including moisture treatment, membranes, primers, resins and hardening agents from a single manufacturer with proof of NTMA Associate membership.
   2. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
   3. Obtain each color, grade, type, and variety of granular material from single source with resources to provide materials of consistent quality in appearance and physical properties.

D. NTMA Standards: Comply with NTMA’s “Terrazzo Specifications and Design Guide” and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

E. Mock-Ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mock-ups for terrazzo including accessories.
      a. Size: Minimum 100 sq. ft. (9.3 sq. m) of typical poured-in-place flooring and base condition for each color and pattern in locations directed by Architect .
   2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.
   3. Installer shall have at least five (5) years of satisfactory experience in installation of epoxy terrazzo. Installer shall demonstrate experience during last five (5) years by having completed at least five (5) projects of comparable scope and complexity of at least 50 percent of the total square footage of this project.

1.6 PREINSTALLATION MEETINGS

A. Pre-Installation Conference: Conduct conference at project site two weeks prior to start of installation. Attendees shall include Contractor, Architect, certified installer, Owner's Representative, and weather barrier manufacturer's designated field representative.
   1. Agenda: As a minimum discuss:
   2. Surface preparation.
   3. Substrate condition and pretreatment.
   4. Minimum curing period.
   5. Special details and sheet flashing.
   6. Sequence of construction, responsibilities, and schedule for subsequent operations.
   7. Installation procedures.
   8. Testing and inspection procedures.
   9. Protection and repair procedures.
   10. Review and approval

B. Project Meetings. Review methods and procedures related to terrazzo including, but not limited to, the following:
   1. Inspect and discuss installation procedures, joint details, job site conditions, substrate specification, vapor barrier details and coordination with other trades.
   2. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
   3. Review special terrazzo designs and patterns.
   4. Review dust control procedures.
   5. Review plans for concrete curing and site drying to enable timely achievement of suitable slab moisture conditions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 80 deg F. Store materials on flat surfaces.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
   1. Maintain the ambient room and floor temperature at 50°F or above for a period extending 72 hours before, during and after floor installation.
   2. Prior to and during each day of installation, verify that the dew point is at least 5°F less than the slab and air temperature.

B. Field Measurements: Verify actual dimensions of construction contiguous with pre-cast terrazzo by field measurements before fabrication.

C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

F. Provide protection from other trades prior to date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable manufacturers; subject to compliance with specified requirements, or equal:
   1. Basis of design: Terrazzo & Marble Supply Companies, Manufacturer Systems Epoxy Matrix. (www.tmsupply.com).
   2. Quadrant Chemical Companies.
   3. TEC Specialty Construction Brands, Inc., Tuff-Lite Epoxy Terrazzo Systems

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For epoxy flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.3 MATERIALS

A. Primer for Slabs above Grade: Manufacturer's Primer.

B. Moisture Vapor Treatment for Slabs-On-Grade, Light Weight Concrete and Green Concrete: Manufacturer Moisture Vapor Treatment.
   1. Physical properties of moisture mitigating primer shall have a maximum of 0.3 perms with 100% RH. Moisture Vapor Treatment must suppress a minimum of 91% Relative Humidity.

C. Flexible Reinforcing Membrane for Substrate Crack Preparation and Reflective Crack Reduction: Manufacturer Iso-Crack Epoxy Membrane.
   1. Reinforcement (Optional): fiberglass scrim.

D. Epoxy Matrix: Manufacturer Epoxy Matrix in color required for mix indicated.
   1. Physical properties without aggregates. All specimens cured for 7 days at 75°F plus or minus 2°F and 50 percent plus or minus 2 percent RH. This product shall meet the following requirements

Property	**Test Method**	**Terrazzo Typical Results**
Hardness	ASTM D-2240 using Shore-D Durometer	75-85
Tensile Strength	ASTM D-638	3,000 psi min. to 5000 psi max.
Compressive Strength	ASTM D-695 Specimen B cylinder	12,000 psi min. (82.7 MPa)
Flexural Strength	ASTM D-790	4,500 psi min. (31.7 MPa)

Chemical Resistance	ASTM D-1308 seven days at room temperature by immersion method	No deleterious effects: • Distilled Water • Mineral Oil • Isopropanol • Ethanol • 0.025 Detergent Solution • 1% Soap Solution • 10% Sodium Hydroxide • 10% Hydrochloric Acid • 30% Sulfuric Acid • 5% Acetic Acid

2. Physical properties with aggregates. For Epoxy Matrix blended with three volumes of Valders marble blended 60% #1 chip and 40% #0 chip, ground and grouted with epoxy resin according to Installation Specifications, finishing to a nominal 3/8" (9.5 mm) thickness. All specimens cured for 7 days at 73-77°F and 50 percent RH plus or minus 2 percent RH. This finished Epoxy Matrix shall meet the following requirements:

Property	**Test Method**	**Epoxy Terrazzo Typical Results**
Flammability	ASTM D-635	Self extinguishing, extent of burning 0.25 inches (6.4 mm) max
Thermal Coefficient of Linear Expansion	ASTM D-696	25x10-6 inches per inch per degrees to 140ºF 11.4 x 10-7 cm per cm per 1C to 601C Max
Bond Strength	ACI COMM 403, Bulletin 59-43 (pages 1139-1141)	300 psi (100% concrete failure) 2.1 MPa (100% concrete failure)

E. Aggregates] complying with NTMA gradation standards for mix indicated and containing no deleterious or foreign matter.
   1. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
   2. 24-Hour Absorption Rate: Less than 0.74 percent.
   3. Dust Content: Less than 1.0 percent by weight.

F. Finishing Grout: Manufacturer Epoxy Matrix or Manufacturer Clear Resin with a broadcast of limestone filler as recommended by Manufacturer Resin Systems product data.

2.4 STRIP MATERIALS

A. Divider Strips: L-type.
   1. Material selected from full range of material and color options.
   2. Guide for commonly used L-type divider strips for Epoxy Terrazzo Systems:

System Height	Strip Height	Strip Width
3/8” System	3/8”	16 gauge 1/8” 1/4”

2.5 MISCELLANEOUS ACCESSORIES

A. Anchoring Devices:
   1. Strips: Provide mechanical anchoring devices for strip materials as required for secure attachment to substrate.
   2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by terrazzo contractor for proper anchorage and support of units for conditions of installation and support.

B. Patching and Fill Material: Manufacturer Fill and selected aggregates as recommended by Manufacturer Resin Systems.

C. Joint Compound: Manufacturer Joint Filler, color to be selected by architect to match/compliment terrazzo.

D. Cleaner: Manufacturer Terra Clean, a neutral cleaner with pH factor between 7 and 10 specifically designed for terrazzo.

E. Sealer: Slip and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10, that meets a standard coefficient of friction of 0.5 or higher, as measured by the James Machine (ASTM D-2047 Test Method), does not affect physical properties of terrazzo and complies with NTMA’s “Terrazzo Specifications and Design Guide.”
   1. VOC content of adhesive (100 g/L less water) as required by State of Tennessee High Performance Building Requirements.

2.6 PRECAST TERRAZZO

A. Precast Terrazzo Units: Precast epoxy terrazzo base and stair tread units.
   1. Manufacturers: Subject to compliance with requirements, provided products acceptable to architect.

B. Precast Terrazzo Base Units: 3/8” (6.4 mm) thick, cast in maximum lengths possible, but not less than 36” (900 mm).
   1. Type: As indicated.
   2. Height: As indicated
   3. Outside Corner Units: With finished returned edges at outside corner.
   4. Color and Pattern: Match approved sample

C. Terrazzo Cove Base:
   1. Resin Systems Epoxy Matrix poured-in-place cover base with 3/4” radius, in height as indicated in the finish schedule

D. Precast Terrazzo Stair Treads: Thickness indicated with cast-in nosing.
   1. Tread/Riser: 1/2” thick epoxy, Type as indicated on the finish schedule with abrasive pattern as indicated on the finish schedule
   2. Color and Pattern: approved sample

2.7 TERRAZZO MIX

A. Mix: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's product data for matrix and aggregate proportions and mixing.
   1. Color and Pattern Schedule: Where the following designations are indicated, provide specified terrazzo matrices matching Architect's samples:
      a. All colors: 30% GA White, 30% Italian Botticino, 20% TM Post Consumer Ash Gray Glass, 10% ASG One Sided Mirror, 10% Fresh Water Mother of Pearl.
      b. Terrazzo filler shall be Clear Glass Fines.
      c. Sample shall be approved by Architect.
      d. Adjustments of proportions to individual colors may be necessary to obtain the intended appearance. No additional cost shall be charged to Owner if overall proportions for entire project remain within he proportions specified above.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Level Tolerance: Concrete sub-floor shall be level with a maximum variation from level of 1/4" in any 10 feet (6.4 mm in 3.1m). Irregularities of the surface requiring patching and/or leveling shall be done using Manufacturer Fill and selected aggregates as recommended by Manufacturer Resin Systems.
   2. Concrete floor shall have a steel trowel finish.
   3. Concrete shall have been cured a minimum of 28 days. No curing agents shall have been used in areas to receive terrazzo.
   4. Concrete slab shall have an efficient moisture vapor barrier (minimum 15 mils (.4 mm thickness)) directly under the concrete slab. Moisture barrier shall not be punctured.
   5. Saw cutting of control joints shall have been done between 12 and 24 hours after placement of the structural concrete and at a frequency compatible with ACI recommendations.

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

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease and curing compounds, that might impair terrazzo bond. Provide clean, dry and neutral substrate for terrazzo application.

B. Concrete Slabs:
   1. Provide sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form- release agents, dust, dirt, grease, oil and other contaminants incompatible with terrazzo.
      a. Prepare concrete mechanically by shot blasting. Surface preparation results should achieve a CSP3-CSP5 profile according to International Concrete Repair Institute Guideline No. 03732.

b. The General Contractor shall be responsible for correcting non-conforming concrete substrates using materials compatible with epoxy terrazzo flooring system and as approved by the Terrazzo Contractor.
   1. Materials used to correct nonconforming conditions must be compatible with the selected epoxy system and be approved by the manufacturer of
      epoxy resin materials and Terrazzo Contractor.
c. Repair cracks and non-expansion joints greater than 1/16" (1.6 mm) wide according to Manufacturer Resin Systems Technical Bulletin 009 Crack Detailing and Joint Treatments for Manufacturer Resin epoxy terrazzo.
d. Protect other work from dust generated by shot blasting operations. Control dust to prevent air pollution and comply with environmental protection regulations.
e. Erect and maintain temporary enclosures and other suitable methods to prevent dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

C. Verify that concrete substrates are visibly dry and free of moisture. Document the moisture level of concrete slab-on-grade surfaces prior to installation of terrazzo. Test moisture level with accord with ASTM F2170 (determining relative humidity in concrete slabs using in situ probes).

D. Primer application:
   1. At Slabs-On-Grade, Light Weight Concrete and Green Concrete: Apply moisture vapor treatment in accord with Moisture Vapor Treatment Product Data Sheet.
   2. At Slabs Above Grade: Apply primer in accord with manufacturer's product data.Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 INSTALLATION

A. General:
   1. Comply with NTMA's written recommendations for terrazzo and accessory installation.
   2. Place, rough grind, grout, cure grout, fine grind and finish terrazzo according to Terroxy Resin Systems Epoxy Matrix Product Data Sheet and NTMA's "Terrazzo Specifications and Design Guide."
   3. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
   4. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

B. Thickness: 3/8" (9.5 mm)

C. Flexible Reinforcing Membrane:
   1. Membrane Application for Isolated Cracking: Route out all cracks and fill with 100% solids epoxy. Apply Flexible Reinforcing Membrane (spread at 40 mils thickness) across the crack allowing a minimum of 12 inches on either side. Embed fiberglass scrim on top wet membrane. Allow for 10% of total terrazzo square footage in lineal feet of crack detailing. Ex) 10,000 SF allow for 1,000 LF of crack detailing. 1LF of crack detailing shall allow for 2 SF of Iso-Crack Epoxy Membrane, 1 SF on each side of the crack or control joint.

D. Divider and Accessory Strip installation:
   1. Install strips in adhesive setting bed without voids below strips or mechanically anchor strips as required to attach strips to substrate.

2. Control-Joint Strips: Separate double L-type angles, positioned back to back with minimum 1/8"-1/4" width between.
3. Construction-Joint (Cold-Joint) Strips: Separate double L-type angles, positioned back to back with minimum 1/8"-1/4" width between. Fill joint and area between strips with elastomeric joint filler.
4. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
5. Isolation-Joint Strips: Separate double L-type angles, positioned back to back with minimum 1/8"-1/4" width between. Fill area between strips with elastomeric joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

E. At terminations and doorways, saw cut concrete and chisel out to provide proper termination of flooring material; no featheredges allowed.

F. Placing Terrazzo:
1. Mix epoxy matrix with chips and fillers in ratios directed by Manufacturer Resin Systems product data.

2. Trowel apply terrazzo mixture over epoxy primer to provide a dense flat surface to top of divider strips. Allow to cure in accord with Manufacturer Resin Systems product data before rough grinding.
3. Extend flooring material up wall surface to form integral coved base. [. Bond directly to wall surfaces. Bases in wet areas shall be free of seams which could allow water to enter substrate.

G. Rough Grinding: Grind with 24 grit silicon carbide or 24 grit turbo diamonds until all terrazzo strips and marble chips are uniformly exposed.

H. Grouting:
1. Cleanse floor with clean water and rinse.
2. Remove excess rinse water by wet vacuum, dry and fill voids with Manufacturer Resin Systems Epoxy Matrix or Clear Resin with a broadcast of limestone filler.
3. Allow grout to cure. Grout may be left on terrazzo until other trades work is completed.

I. Polishing: Polish with 120 grit T&M Resin Pads or equivalent stones until all grout is removed from surface. Repeat rough grinding, grout coat and polishing if large terrazzo chip voids exist after initial polishing. Produce surface with a minimum of 70 percent aggregate exposure.

J. Completed flooring shall be uniform in color, texture and aggregate distribution. Surface shall be in place and uniform and free of bubbles, foreign material, defect or irregularity. Trim edges and where material abuts adjacent construction. Edges at doors shall occur under closed door.

3.4 PRECAST TERRAZZO INSTALLATION

A. Install precast units using method recommended by NTMA and manufacturer unless otherwise indicated.

B. Seal joints between units with joint sealants.

3.5 CLEANING AND PROTECTION

A. Cleaning: Remove grinding dust from installation and wash all surfaces with Manufacturer Terra Clean.

B. Sealing: Apply slip and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10, that meets a standard coefficient of friction of 0.5 or higher, as measured by the James Machine (ASTM D-2047 Test Method), does not affect physical properties of terrazzo and complies with NTMA's "Terrazzo Specifications and Design Guide."

C. Protection: Upon completion, the work shall be ready for final inspection and acceptance by the owner or his agent. Provide final protection and maintain conditions, in a manner acceptable to terrazzo contractor, that ensure terrazzo is without dam- age or deterioration.

END OF SECTION 09 67 16

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:
   1. Resinous flooring system as shown on the drawings and in schedules.
      a. Epoxy Based Flooring
      b. Self-Leveling Cementitious Urethane Flooring

B. Related sections include the following:
   1. Section 03 30 00 - Cast-in-Place Concrete.

1.3 SYSTEM DESCRIPTION

A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy based multi roller applied flooring system with Micro or Macro colored decorative chips and urethane topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 40 mils. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

B. Cove base shall be applied where noted on plans and per manufacturers standard details unless otherwise noted.

1.4 SUBMITTALS

A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
   1. Include Volatile Organic Compound information for material, adhesive and sealants.

B. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.

C. Samples: A three (3) inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system.

1.5 QUALITY ASSURANCE

A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

B. The Applicator shall have been approved by the flooring system manufacturer in all phases of surface preparation and application of the product specified.

C. No requests for substitutions shall be considered that would change the generic type of the specified System.

D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.

E. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

F. System shall be in compliance with the Indoor Air Quality requirements of California Section 01350 as verified by a qualified independent testing laboratory.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection
   1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 90 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
   2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal: The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

A. Site Requirements
   1. Application may proceed while air, material and substrate temperatures are between 60 degrees F and 90 degrees F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
   2. The relative humidity in the specific location of the application shall be less than 85 percent and the surface temperature shall be at least 5 degrees F above the dew point.
   3. The Applicator shall ensure that adequate ventilation is available for the work area.
   4. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with epoxy material.
   1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of twenty eight days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.

2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary or desirable).
3. Sealers and curing agents shall not to be used.
4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements
1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. The Owner shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

PART 2 - PRODUCTS

2.1 EPOXY-BASED FLOORING

A. Dur-A-Flex, Inc, Dur-A-Chip, Epoxy-Based seamless flooring system:
1. System Materials:
   a. Primer: Dur-A-Flex, Inc, Dur-A-Glaze #4 WB resin and hardener.
   b. First Broadcast Coat: Dur-A-Flex, Inc, Dur-A-Gard OPF resin and hardener.
   c. Second Broadcast and Grout Coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
   d. Chips: Dur-A-Flex, Inc. Macro or Micro Decorative Colored Chips.
   e. Topcoat: Dur-A-Flex, Inc. Armor Top resin, hardener and grit.
2. Patch Materials:
   a. Shallow Fill and Patching: Dur-A-Flex, Inc. Dur-A-Glaze Rapid-Patch.
   b. Deep Fill and Sloping Material (over 1/4 inch): Dur-A-Flex, Inc. Dur-A-Crete.

B. MANUFACTURER
1. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone:(860)528-9838,
   Fax: (860) 528-2802
2. Manufacturer of Approved System shall be single source and made in the USA.

C. PRODUCT REQUIREMENTS
1. Primer: Dur-A-Glaze #4 WB.

2.	Percent Solids	56 %
3.	VOC	2 g/L
4.	Bond Strength to Concrete ASTM D4541	550 psi, substrates fails
5.	Hardness, ASTM D3363	3H
6.	Elongation, ASTM D2370	9 %
7.	Flexibility ASTM D1737	(1/4: Cylindrical mandrel), Pass
8.	Impact Resistance, MIL D-2794	>160

9. Abrasion Resistance ASTM D4060, CS 17 wheel, 1,000 g Load — 30 mg loss

D. Broadcast Coat: Dur-A-Gard OPF

1. Percent Solids — 100 %
2. VOC — 59 g/L
3. Compressive Strength, ASTM D695 — 16,000 psi
4. Tensile Strength, ASTM D638 — 3,800 psi
5. Flexural Strength, ASTM D790 — 4,000 psi
6. AbrasionResistance,ASTMD4060 — C-10 Wheel, 1,000 gm load, 1,000 cycles 35 mg loss
7. Flame Spread/NFPA-101, ASTM E84 — Class A
8. Impact Resistance MIL D-3134 — 0.025 inch Max
9. Water Absorption. MIL D-3134 — Pass
10. Potlife at 70 degrees F — 20-25 minutes

E. Broadcast Coat and Grout Coat: Dur-A-Glaze #4 Water Clear

1. Percent Solids — 100 %
2. VOC — 3.8 g/L
3. Compressive Strength, ASTM D695 — 11,200 psi
4. Tensile Strength, ASTM D638 — 2,100 psi
5. Flexural Strength, ASTM D 790 — 5,100 psi
6. AbrasionResistance,ASTMD4060 — C-10 Wheel, 1,000 gm load, 1,000 cycles 29 mg loss
7. Flame Spread/NFPA-101, ASTM E 84 — Class A
8. Impact Resistance MIL D-24613 — 0.0007 inches, no cracking or delamination
9. Water Absorption. MIL D-24613 — Nil
10. Potlife @ 70 F — 20 minutes

F. Topcoat: Armor Top.

1. Percent Solids — 95 %
2. VOC — 0 g/L
3. Tensile Strength, ASTM D 2370 — 7,000 psi
4. Adhesion, ASTM 4541 — Substrate Failure
5. Hardness, ASTM D 3363 — 4H
6. 600 Gloss ASTM D 523 — 70
7. Abrasion Resistance, ASTM D4060 — Gloss Satin
   CS-17 wheel (1,000 g load) 1,000 cycles — 48 mg loss with grit 10-12 mg loss without grit
8. Pot Life, 70 F, 50% RH — 2 Hours
9. Full Chemical Resistance — 7 days

2.2 SELF-LEVELING CEMENTITIOUS URETHANE FLOORING

A. Dur-A-Flex, Inc, Poly-Crete MDB (self-leveling broadcast quartz), Urethane topcoat seamless flooring system.

1. System Materials:
   a. Topping: Dur-A-Flex, Inc, Poly-Crete MD resin, hardener and aggregate.
   b. The aggregate shall be Dur-A-Flex, Inc. flintshot quartz aggregate.

c. Topcoat: Dur-A-Flex, Inc. Poly-Crete Color-Fast resin, hardener and powder aggregate.

2. Patch Materials
   a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to ¼ inch).
   b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Poly-Crete WR

B. MANUFACTURER
   1. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone:(860)528-9838,
      Fax: (860) 528-2802
   2. Manufacturer of Approved System shall be single source and made in the USA.

C. PRODUCT REQUIREMENTS

A. Topping — Poly-Crete MD

1. Percent Reactive	100 %
2. VOC	0 g/L
3. Bond Strength to Concrete ASTM D 4541	400 psi, substrates fails
4. Compressive Strength, ASTM C 579	7,400 psi
5. Tensile Strength, ASTM D 638	1,800 psi
6. Impact Resistance @ 125 mils, MIL D-3134, No visible damage or deterioration	>160 inch lbs

B. Topcoat — Poly-Crete Color-Fast

1. Percent Solids	100%
2. VOC	0 g/L
3. Compressive Strength, ASTM C 579	7,800 psi
4. Tensile Strength, ASTM D 638	4,200 psi
5. Flexural Strength, ASTM D 790	1,000 psi
6. Abrasion Resistance, ASTM D 4060 CS-17 wheel, 1,000gm load, 1,000 cycles	30 mg loss
7. Impact Resistance, ASTM D 1709	160 in.lbs
8. Shore D Hardness, ASTM D 2240	65
9. Gloss, ASTM D 523, 60^0	Semi-gloss appearance

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
   1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

A. General

1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
   a. Perform relative humidity test using is situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
   b. If the relative humidity exceeds 75 percent then Dur-A-Flex, Inc Dur-A-Glaze MVP Primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on grade substrates without a vapor barrier may also require the moisture mitigation system.
3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.
4. Mechanical surface preparation:
   a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 3-4 as described by the International Concrete Repair Institute.
   b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
   c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
   d. Cracks and joints (non-moving) greater than 1/8 inch wide shall be chiseled or chipped-out and repaired per manufacturer's recommendations.
5. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 APPLICATION-EPOXY BASED MATERIAL

A. General:

1. The system shall be applied in six distinct steps as listed below:
   a. Substrate preparation.
   b. Priming.
   c. First broadcast coat application with first chip broadcast.
   d. Second broadcast coat with second chip broadcast.
   e. Grout coat application.

f. Topcoat application.

2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Primer:

1. Primer: Dur-A-Glaze #4 WB Primer mixed at the ratio of 1 part resin to 4 parts hardener per the manufacturer's instructions.
2. Apply primer with1/8 inch notched squeegee and back roll at the rate of 200 square feet per gallon to yield a dry film thickness of 4 mils.

C. Broadcast Coats:

1. Apply broadcast coat as a double broadcast system as specified by the Architect.
2. The broadcast coat shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener.
3. Add resin to hardener and thoroughly mix by suitably approved mechanical means.
4. Apply first broadcast coat over horizontal surfaces using the dip and roll, and back roll method at the rate of 300 square feet per gallon using the Dur-A-Gard OPF material.
5. Broadcast chips to excess into the wet material, Macro chips at the rate of 0.1 pounds per square foot and Micro chips at the rate of 0.15 pounds per square foot.
6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.
7. Scrape floor with a trowel or floor scraper. Sweep and vacuum floor again.
8. Apply a second broadcast coat of resin by flat squeegee, then back rolled with a coverage rate of 200 square feet per gallon with Dur-A-Glaze #4 Water Clear material.
9. Broadcast chips to excess, Macro chips at the rate of 0.1 pounds per square foot and Micro chips at the rate of 0.15 pounds per square foot.
10. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose chips.
11. Scrape floor with trowel or floor scraper. Sweep and vacuum floor again.

D. Grout Coat:

1. Grout coat: comprised of Dur-A-Glaze # 4 Water Clear material that is mixed in the ratio of 1 part hardener to 2 parts resin and installed per the manufacturer's recommendations.
2. Apply grout with squeegee and back roll with a coverage rate of 150 square feet per gallon.

E. Topcoat:
   1. Apply topcoat of Armor Top by roller at the rate of 500 square feet per gallon to yield a dry film thickness of 3 mils.
   2. Topcoat: comprised of a liquid resin and hardener mixed at the ratio of 4 parts hardener to 1 part resin and bag of grit per the manufacturer's instructions.
   3. The finish floor will have a nominal thickness of 40 mils.

3.4 APPLICATION-SELF-LEVELING CEMENTITIOUS URETHANE MATERIAL

A. General

   1. The system shall be applied in three distinct steps as listed below:
      a. Substrate preparation
      a. Topping/overlay application with quartz aggregate broadcast.
      b. Topcoat application, with a anti-slip aggregate broadcast if required
   2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
   3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
   4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
   5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping

   1. The topping shall be applied as a self-leveling system as specified. The topping shall be applied in one lift with a nominal thickness of 3/16 inch.
   2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
   3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
   4. The topping shall be applied over horizontal surfaces using a pin rake, trowels or other systems approved by the Manufacturer.
   5. Immediately upon placing, the topping shall be degassed with a 15/16 inch spiked roller.
   6. Quartz aggregate shall be broadcast to excess into the wet material at the rate of 1 lbs/sf.
   7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

C. Topcoat

   1. The topcoat shall be mixed and applied per manufacturer recommended procedure.
   2. The topcoat shall be comprised of three components, a resin, hardener

and filler as supplied by the manufacturer.

3. The topcoat will be applied at the rate of 100 sf per kit (1.1 gal).

4. Non-Skid if required is broadcast at the rate of 1 lb per 100 sf and back rolled into the coating.
5. The finish floor will have a nominal thickness of 1/4 inch.

3.5 FIELD QUALITY CONTROL

A. Tests, Inspection: The following tests shall be conducted by the Applicator:
   1. Temperature: Air, substrate temperatures and, if applicable, dew point.
   2. Coverage Rates: Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.6 CLEANING AND PROTECTION

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 09 67 23

SECTION 09 68 00 - CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
1. Modular carpet tile.
2. Modular walk-off carpet tile.
3. Sheet carpet.
4. Installation accessories and materials.

B. Related Sections include the following:
1. Division 03 “Concrete”
2. Division 09 Section "Resilient Flooring and Accessories" for resilient wall base and accessories installed with carpet.

1.2 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
1. Review delivery, storage, and handling procedures.
2. Review ambient conditions and ventilation procedures.
3. Review subfloor preparation procedures.

1.3 REFERENCES

A. Carpet and Rug Institute (CRI) Carpet Installation Standard, current edition.

1.4 SUBMITTALS

A. Product Data: For the following, including installation recommendations for each type of substrate:
1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include Volatile Organic Compound information for carpet and adhesive.

B. Shop Drawings: Show the following, as applicable:
1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Seam locations, types, and methods.
4. Type of subfloor.
5. Type of installation.
6. Pattern type, repeat size, location, direction, and starting point.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   1. Carpet: 12-inch- square Sample.
   2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- long Samples.

D. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI Carpet Installation Standard, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

A. Comply with CRI Carpet Installation Standard, Section 7, "Site Conditions."

B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Carpet Tile: Refer to Finish Schedule

B. General requirements:
   1. Green Label Plus Certified, backing and facing combined.
   2. Moisture barrier backing.
   3. Fiber Type: Minimum nylon 6, preferably nylon 6,6.
   4. Antimicrobial
   5. VOC content of adhesive (50 g/L less water)

C. Color and Pattern: provide minimum three coordinating patterns. Color and pattern to be selected.

2.2 SHEET CARPET

A. Sheet Carpet: Refer to Finish Schedule

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
   1. At Contractor's option pre-applied, releasable adhesive may be provided.

C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

D. Resilient edge strips: Reference drawings for transition conditions. Color to be selected.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
   1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
   2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
   3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

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

3.2 PREPARATION

A. General: Comply with CRI Carpet Installation Standard, Section 7, "Site Conditions", Section 8 "Substrates" and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

A. General: Comply with CRI Carpet Installation Standard, Section 18, "Modular Carpet," and with carpet tile manufacturer's written installation instructions.

B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.

C. Do not bridge building expansion joints with carpet.

D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern in accordance with Contract Documents and approved shop drawings.

3.4 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet to comply with CRI Carpet Installation Standard, Section 20, "Protecting Indoor Installations.

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION 09 68 00

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Furnish all labor, material, equipment, and services necessary to complete all painting work and related items as indicated by the Contract Documents and as required to complete the work.

B. This work includes the painting and finishing of all interior exposed items and surfaces throughout the project, except as herein specified. Surface preparation, priming, and coats of paint specified are in addition to shop priming.

C. The term "paint" as used herein means all coating systems materials, which includes primers, emulsions, enamels, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coat.

D. Paint all exposed surfaces whether or not colors are designated in a "schedule", except where the natural finish of the material is obviously intended as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color of finish is not designated the Architect will select these from standard colors available for the materials systems as specified.
   1. This section specifically includes painting exterior steel brick lintels, galvanized or primed, and other exposed structural or ornamental steel.

E. Subcontractor shall meet with Architect and review all finishes prior to starting work.

F. Reference Room Finish Schedule and Room Finish Legend for various paint system usage.

G. Related Sections include the following:
   1. Section 09 64 66 - Athletic Wood Flooring, finishes for wood floors.

1.3 WORK NOT INCLUDED

A. The following categories of work are not included as part of the painter applied finish work, or are included in other sections of these specifications, unless otherwise shown or specified.
   1. Shop priming of ferrous metal items may be included under the various sections in which they occur. Also, for such fabricated components as

architectural woodwork, wood casework, and shop fabricated or factory built mechanical and electrical equipment and accessories, verify by referring to the appropriate sections.

2. Prefinished items unless otherwise indicated do not require painting.
3. Concealed Surfaces: Unless otherwise indicated, painting is not required on wall or ceiling surfaces in concealed areas, such as foundation spaces, attics, furred areas, utility tunnels, pipe spaces, duct shafts, and elevator shafts, as applicable to this project. Paint all piping, equipment and other such items occurring in mechanical and storage rooms.
4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require finish painting, except as otherwise specified.
5. Do not paint any moving parts of operating units, mechanical and electrical parts, such as value and damper operators, linkages, sinkages, sensing devices motor and fan shafts, unless otherwise indicated.
6. Do not paint over code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.4 DEFINITIONS

A. Gloss levels indicated below are based on ASTM D523.
1. G1 - Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees.
2. G2 - Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
3. G3 - Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
4. G4 - Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
5. G5 - Gloss Level 5: 35 to 70 units at 60 degrees.
6. G6 - Gloss Level 6: 70 to 85 units at 60 degrees.
7. G7 - Gloss Level 7: More than 85 units at 60 degrees.

1.5 QUALITY ASSURANCE

A. Provide finish coats that are compatible with the prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon requests from other subcontractors, furnish information on the characteristics of the specified finish materials, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify the Architect in writing of anticipated problems using the coating systems as specified with substrates primed by others.

B. Consult with insulation subcontractor to assure compatibility of insulation jacketing and paint finishes.

1.6 SUBMITTALS

A. Manufacturer's paint specifications shall be submitted.

B. Manufacturer's Data: List each material and cross reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.

C. Submit color samples for use by Architect in making a color schedule.

D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Prepare 8 x 10 inch actual paint samples on rigid backing for comparison and approval. Verify that backing accurately depicts paint color by comparing to manufacturer's color samples.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

1.7 DELIVERY AND STORAGE

A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label and application instructions thereon.

1.8 PROJECT CONDITIONS

A. No painting shall be done until all other work is substantially complete.

B. Do not apply water base paints when the temperatures of surfaces to be painted and the surrounding air temperatures are below 70 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.

C. Do not apply solvent-thinned paints when the temperature of surrounding surfaces to be painted and the surrounding air temperatures are below 55 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.

D. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions. Painting may be continued during the inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

1.9 EXTRA STOCK

A. Provide one unopened gallon container of every paint type and color.

B. Label all containers with color and paint type.

C. Store at location as directed by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers offering products complying with requirements include the following:
   1. Pittsburg Paints
   2. Sherwin-Williams Company
   3. Glidden Professional
   4. Benjamin Moore

2.2 MATERIALS

A. Selections listed are intended to indicate the standard of quality and the type of finish required. Products names listed herein are from the first named manufacturer unless otherwise noted; equivalent items of other manufacturers will be acceptable. All materials shall be the manufacturer's "top of the line" or "first line" or "Best". Coating thickness is given in terms of MDF or Minimum Dry Film Thickness.

B. All paint shall be 100% lead-free.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Applicator must examine the areas and conditions under which painting work is to be performed. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Applicator.

B. If the applicator does not notify the Architect in writing of any defects in the surface and proceeds with the work he shall be responsible for re-preparing and repainting the surfaces not satisfactory to the Architect at no additional cost.

C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

3.2 PREPARATION

A. General:
   1. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
   2. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finished painted or provided surface applied protection prior to surface preparation and painting operations. Following completion of painting of each space or

areas, reinstall the removed items by workmen skilled in the trades involved.

3. Clean surfaces to be painted before applying paint or surface treatments. Use a mild detergent solution to remove accumulated dirt, chalk, and grime. After cleaning with solution rinse the surfaces thoroughly with water and allow to dry completely before painting with primer or finish coat.
   a. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Provide cleaning solvents of low toxicity and flash point in excess of 100 degrees F. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.
4. Prepare existing painted surfaces by removing loose, peeling or blistered paint. Sand and prime prior to applying finish coats.
5. Existing painted surfaces having a gloss finish shall be de-glossed by sanding to a dull finish using #150/#180 sand paper. Clean surfaces removing all sanding residue. Do not de-gloss lead based paints. Previously primed or previously painted surfaces that have been damaged shall be spot primed.
6. Galvanized Metals: Clean surface with PPG "Leptyne" paint thinner or mineral spirits removing all residue, oil, grease, or other contaminants. If the metal has been treated with a factory applied stabilizer the metal must be cleaned by either brush, blasting, or chemical treatment to remove all stabilizers before painting. Contact paint manufacturer for recommendations.

B. Prior to starting painting furnish and place drop cloths to protect other work.

C. Wood: All surfaces shall be sanded as required to make them smooth and ready to receive the finish.

D. Metals: Clean non-galvanized, ferrous surfaces that have not been shop coated of all oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning, complying with SSPC recommendations.

3.3 APPLICATION

A. The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between coat applications with fine sandpaper, or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
   1. Stained Wood (Transparent Finishes): Apply stain, washcoat (reduced vinyl sealer), filler, vinyl sealer, sand (220 grit stearated paper) and two coats of polyurethane.
   2. Each coat of paint shall be a different color. The Architect must approve the application of each coat prior to applying the next coat. Failure to follow this procedure will result in the application of an additional coat.

B. Apply additional coat when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.

C. "Exposed Surfaces" shall mean areas visible when permanent or built-in fixtures, etc., are in place in areas scheduled to be painted.
   1. This includes but is not limited to the backside of glazing stops visible through the glass, walls behind cabinetry when doors are opened, and tops of millwork, doors, casework, etc. that can be seen from above if standing on a ladder or a higher floor.

D. Sand lightly between each succeeding enamel or varnish coat.

E. Omit the first coat (Primer) on metal surfaces which have been shop primed and touchup painted, unless otherwise specified.

F. Pigmented (Opaque Finishes): Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.

G. Roller shall be kept clean and shall not be allowed to become stiff.

H. Finished work shall be uniform, smooth, and free from runs, sags, defective brushing and clogging of lines and angles. Edges of paint applied adjoining other materials or other colors shall be sharp and clean without overlapping.

3.4 ADJUSTING AND CLEANING

A. Remove any paint, spots, oils, and stains from all building surfaces.

B. At completion of work just prior to acceptance of the building by the Owner, touch up and restore all finishes if damaged or defaced and leave in new condition.

3.5 SCHEDULE, EXTERIOR PAINT SYSTEMS

A. Exterior Ferrous Metals (high gloss):
   1. Primer: Sherwin Williams Kem-Kromik Universal Metal Primer (<420 g/L VOC) 3.0 to 4.0 Dry Mils. Touch-up damaged primer.
   2. Intermediate: Sherwin Williams Industrial Enamel VOC Complying B54Z series (<420 g/L VOC) 2.0 to 3.0 Dry Mils.
   3. Finish Coat: Sherwin Williams Industrial Enamel VOC Complying B54WZ series (<420 g/L VOC) 2.0 to 3.0 Dry Mils.

B. Exterior Aluminum (high gloss):
   1. Primer: Sherwin Williams Pro-Industrial Pro-Cryl Universal Primer B66 Series (<100g/L VOC) 2.0 to 4.0 Dry Mils.
   2. Intermediate: Sherwin Williams Pro Industrial Industrial Enamel 100 B54WZ series (<100 g/L VOC) 2.0 to 4.0 Dry Mils.
   3. Sherwin Williams Pro Industrial Industrial Enamel 100 B54WZ series (<100 g/L VOC) 2.0 to 4.0 Dry Mils.

C. Exterior Galvanized Metal (high gloss):
   1. Primer: Sherwin Williams Pro-Industrial Pro-Cryl Universal Primer B66 Series (<100g/L VOC) 2.0 to 4.0 Dry Mils.
   2. Intermediate: Sherwin Williams Pro Industrial Industrial Enamel 100 B54WZ series (<100 g/L VOC) 2.0 to 4.0 Dry Mils.
   3. Sherwin Williams Pro Industrial Industrial Enamel 100 B54WZ series (<100 g/L VOC) 2.0 to 4.0 Dry Mils.

3.6 SCHEDULE, INTERIOR PAINT SYSTEMS

A. Interior Ferrous Metals, High Performance:
   1. Primer: Shop Primed.
   2. Intermediate: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.
   4. Note: preparation includes Commercial Blast Cleaning of components and review of welds prior to finishing.

B. Interior Ferrous Metals (semi-gloss):
   1. Primer: Shop Primed.
   2. Intermediate: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.

C. Galvanized Metal (semi-gloss):
   1. Primer: Sherwin Williams DTM Acrylic Primer Finish White B66W00001
   2. Intermediate: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.

D. Aluminum (semi-gloss):
   1. Primer: Sherwin Williams Pro-Industrial Pro-Cryl Universal Primer B66 Series (<100g/L VOC) 2.0-4.0 Dry Mils.
   2. Intermediate: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Interior Latex Semi-Gloss B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.

E. DryFall Interior Ferrous Metal (flat):
   1. Primer: Shop Primed or Sherwin Williams Kem Bond HS B50AZ8 (≤320 g/L VOC) 2.0 Dry Mils.
   2. Intermediate: Sherwin Williams Low VOC Waterborne Acrylic Dryfall B42B81 (≤50 g/L VOC) 3.0-4.5 Dry Mils.
   3. Finish Coat: Sherwin Williams Low VOC Waterborne Acrylic Dryfall B42B81 (≤50 g/L VOC) 3.0-4.5 Dry Mils.

F. Dryfall Galvanized Metal, Aluminum (flat):
   1. First Coat: Sherwin Williams Low VOC Waterborne Acrylic Dryfall B42B81 (≤50 g/L VOC) 3.0-4.5 Dry Mils.
   2. Finish Coat: Sherwin Williams Low VOC Waterborne Acrylic Dryfall B42B81 (≤50 g/L VOC) 3.0-4.5 Dry Mils.

G. Gypsum Board (eggshell):
   1. Primer: Sherwin Williams PrepRite ProBlock Int/Ext Latex Primer Sealer White B51W00020 (≤96 g/L VOC) 1.4 Dry Mils.
   2. Intermediate: Sherwin Williams ProMar 200 Interior Latex Eg-Shel B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Interior Latex Eg-Shel B31W02251 (≤99 g/L VOC) 1.6 Dry Mils.

H. Painted Plywood and Wood Trim (flat):
   1. Primer: Quick Dry Stain Blocking Primer Interior Latex (62 g/L VOC) 1.1 Dry Mils.
   2. Intermediate Coat: Sherwin Williams ProMar 200 Zero VOX Interior Latex Flat B30-2600 Series (0 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Zero VOX Interior Latex Flat B30-2600 Series (0 g/L VOC) 1.6 Dry Mils.

I. Painted Plywood and Wood Trim (eggshell):
   1. Primer: Quick Dry Stain Blocking Primer Interior Latex (62 g/L VOC) 1.1 Dry Mils.
   2. Intermediate Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series (0 g/L VOC) 1.6 Dry Mils.
   3. Finish Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series (0 g/L VOC) 1.6 Dry Mils.

J. Concrete Masonry Units, semi-gloss):
   1. Block Filler: For previously unfinished units; PrepRite Block Filler B25W00025
   2. Primer: Sherwin Williams PrepRite Classic Interior Latex Primer (90 g/L) 1.3 Dry Mils.
   3. Intermediate Coat: Sherwin Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss K46-150 Series (<141 g/L) 1.5 Dry Mils.
   4. Finish Coat: Sherwin Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss K46-150 Series (<141 g/L) 1.5 Dry Mils.

K. Concrete Masonry Units (eggshell):
   1. Block Filler: For previously unfinished units; PrepRite Block Filler B25W00025
   2. Primer: Sherwin Williams Loxon Concrete & Masonry Primer A24W8300 (96 g/L VOC) 2.1 to 3.2 Dry Mils.
   3. Intermediate Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series (0 g/L VOC) 1.6 Dry Mils.
   4. Finish Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Eg-Shel B20-2600 Series (0 g/L VOC) 1.6 Dry Mils.
   5. Omit primer on previously painted CMU walls. Prepare surface in accordance manufacturer's recommendations.

L. Concrete Masonry Units (semi-gloss):
1. Block Filler: For previously unfinished units; PrepRite Block Filler B25W00025
2. Primer: Sherwin Williams Loxon Concrete & Masonry Primer A24W8300 (96 g/L VOC) 2.1 to 3.2 Dry Mils.
3. Intermediate Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series (0 g/L VOC) 1.6 Dry Mils.
4. Finish Coat: Sherwin Williams ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series (0 g/L VOC) 1.6 Dry Mils.
5. Omit primer on previously painted CMU walls. Prepare surface in accordance manufacturer's recommendations.

M. Stained Wood (satin finish):
1. Stain: Sherwin Williams Wood Classics Interior Oil Stain A49-200 Series (≤524 g/L VOC) compatible with finish coats, color to be selected.
2. First Coat: Sherwin Williams Wood Classics Polyurethane Varnish A67 Series satin finish (488 g/L VOC) 1.4 to 1.7 Dry Mils.
3. Finish Coat: Sherwin Williams Wood Classics Polyurethane Varnish A67 Series satin finish (488 g/L VOC) 1.4 to 1.7 Dry Mils.

END OF SECTION 09 91 00

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes solid phenolic core units:
   1. Toilet Enclosures: Floor Mounted Overhead braced.
   2. Urinal Screens: Wall hung.

B. Related Sections include the following:
   1. Division 06 Section "Rough Carpentry" for blocking.
   2. Division 10 Section "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: For each type of unit indicated.
   1. Provide nominal 6 inch square material samples.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 26-75.
   2. Smoke-Developed Index: 450 or less.

1.5 REGULATORY REQUIREMENTS

A. Conform to ANSI A117.1 and The Americans with Disabilities Act (ADA) for provisions for the physically handicapped.

1.6 PROJECT CONDITIONS

A. Manufacturer to supply a written warranty covering all components and hardware against breakage and corrosion for a period of 15 years.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PHENOLIC-CORE UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Ampco, Inc.
   2. Bobrick Washroom Equipment, Inc.
   3. Bradley Corporation; Mills Partitions.

B. Toilet-Enclosure Style: Overhead braced.

C. Urinal-Screen Style: Wall hung.

D. Door, Panel, Screen, and Pilaster Construction: Solid phenolic panel material, with eased and polished edges. Provide minimum 3/4-inch thick doors and pilasters and minimum 1/2-inch thick panels.

E. Phenolic-Panel Finish:
   1. Color, Pattern and Finish: As selected by Architect from manufacturer's full range of options.

F. Pilaster Shoes and Sleeves (Caps): Fabricated from stainless-steel sheet, not less than 0.031-inch nominal thickness and minimum 3 inches high, finished to match hardware.

G. Brackets (Fittings):
   1. Stirrup Type (toilet compartments): Ear or U-brackets, stainless steel minimum three brackets per attached edge.
   2. Full-Height (Continuous) Type (urinal screens): Manufacturer's standard design; stainless steel.

2.2 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
   1. Material: stainless steel.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's bright dip anodized finish, and

fastened to the tops of pilasters and to the headrail brackets with stainless steel, tamper resistant torx head sex bolts.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Toilet Compartment Fabrication:
1. Dividing panels: 55 inches high and mounted at 14 inches above the finished floor.
2. Doors: 55 inches high and mounted at 14 inches above the finished floor.
3. Pilasters: 82 inches high, mounted within a stainless steel shoe with one-way theft-proof, stainless steel bolts.
4. Wall brackets: thru-bolted to panels and pilasters with one-way bolts and attached to adjacent wall construction with #14 x 1-1/2 inch stainless steel Phillips head screws anchored directly behind the vertical edge of panels and pilasters.

C. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities. Provide stainless steel hardware as follows;
1. Full height, stainless steel, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.
6. Each handicapped door to include: one (1) door pull and one (1) wall stop.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
   1. Maximum Clearances:
      a. Pilasters and Panels: 1/2 inch.
      b. Panels and Walls: 1 inch.
   2. Stirrup Brackets: Secure panels to walls and to pilasters with not less than three brackets attached at midpoint and near top and bottom of panel.
      a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
      b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Wall-Hung Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13

SECTION 10 22 26 - OPERABLE PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.2 SUMMARY This Section includes the following: Keynote

1. Electrically Operated, Continuously Hinged Partitions.

B. Related Sections include the following:

1. Division 03 Sections for concrete tolerances required.
2. Division 05 Sections for primary structural support, including pre-punching of support members by structural steel supplier per operable partition supplier's template.
3. Division 06 Sections for wood framing and supports, and all blocking at head and jambs as required.
4. Division 09 Sections for wall and ceiling framing at head and jambs.

1.3 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

B. NIC: Noise Isolation Class.

C. NRC: Noise Reduction Coefficient.

D. STC: Sound Transmission Class.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified in writing by the operable partition manufacturer, as qualified to install the manufacturer's partition systems for work similar in material, design, and extent to that indicated for this Project.

B. Acoustical Performance: Test operable partitions in an independent acoustical laboratory in accordance with ASTM E90 test procedure to attain no less than the STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.

C. Preparation of the opening shall conform to the criteria set forth per ASTM E557 "Standard Practice for Architectural Application and Installation of Operable Partitions."

1.5 SUBMITTALS

A. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable partition, component, and accessory specified.

B. Shop Drawings: Show location and extent of operable partitions. Include plans, elevations, sections, details, attachments to other construction, and accessories. Indicate dimensions, weights, conditions at openings, and at storage areas, and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel. Indicate blocking to be provided by others.

C. Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.

D. Samples: Color samples demonstrating full range of finishes available by architect. Verification samples will be available in same thickness and material indicated for the work.

E. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.

B. Protect panels during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of operable panel partition openings by field measurements before fabrication.

1.8 WARRANTY

A. Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.

B. Warranty period: Two (2) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, PRODUCTS, AND OPERATION

A. Basis-of-Design Product: Subject to compliance with requirements, provide product of first named manufacturer or comparable product by one of the additionally listed manufacturers as follows:
   1. Modernfold, Inc., a DORMA Group Company - Acousti-Seal #933E
   2. Hufcor.
   3. Panelfold.

2.2 OPERATION

A. Acousti-Seal #933E: Series of continuously hinged flat panels, electrically operated, top supported with operable floor seals.

B. Final Closure:

1. Side Jamb

C. Partition shall be operated by two push button control stations wired in series and located on opposite sides of the partition. Control stations shall be activated by key switch at stack end of partion. Motor unit shall be reversible, continuous duty, and class A insulated. Motor unit shall have NEMA MG1 service factor, high starting torque, thermal overload protection, and open/drip proof enclosure. Motor assembly shall have wiring compliant with NFPA 70, 24 volt controls, compliant with UL508A, and speed of 28 feet/minute. The drive unit motor shall be equipped with outboard limit switches to prevent over-extension. A positive-chain drive attached to the lead panel shall pull the partition across the opening. Cable, belt or other friction type drives will not be accepted.

D. Electric motor shall consist of:

1. A 208-volt, 3-phase

2.3 PANEL CONSTRUCTION

A. Nominal 3-inch (76mm) thick panels in manufacturer's standard 48-inch (1220mm) widths. All panel horizontal and vertical framing members fabricated from minimum 18-gage formed steel with overlapped and welded corners for rigidity. Top channel is reinforced to support suspension system components. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of the edges of the panel skin.

B. Panel skin shall be:

1. Roll-formed steel wrapping around panel edge. Panel skins shall be lock formed and welded directly to the frame for unitized construction. Acoustical ratings of panels with this construction minimum:

a. 50 STC

C. Hinges for Panels, Closure Panels, Pass Doors, and Pocket Doors shall be:

1. Full leaf butt hinges, attached directly to the panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Lifetime warranty on hinges. Hinges mounted into panel edge or vertical astragal are not acceptable.

D. Panel Trim: No vertical or horizontal trim required or allowed on edges of panels; minimal groove appearance at all panel joints.

E. Panel Weights:

1. 50 STC - 8 lbs./square foot

2.4 PANEL FINISHES

A. Panel finish shall be:

1. Reinforced vinyl with woven backing weighing not less than 21 ounces (595 grams) per lineal yard.
2. Full height steel work surface (chalkboard or dry marker board).

B. Panel Trim: Exposed panel trim of one consistent color:

1. To Be Selected from Manufacturer’s Full Range of Color Options by the Architect

2.5 SOUND SEALS

A. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic astragals or astragals in only one panel edge are not acceptable.

B. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.

C. Horizontal Bottom Seals:
   1. Modernfold A2 bottom seal: Automatic operable seals providing nominal 2-inch operating clearance with an operating range of +1/2-inch to –1-1/2-inch which automatically drop as panels are positioned, without the need for tools or cranks.

2.6 SUSPENSION SYSTEM

A. Provide #30 Suspension System
   1. Suspension Tracks: Track shall be structural aluminum. Static loading of track with brackets at 48-inch (1220 mm) centers shall show no failure of track or brackets at 5,000 pounds (2250 kg) point loading at mid-span. Track shall be supported by adjustable steel hanger brackets connected to structural support by pairs of 3/8-inch (9.5 mm) diameter threaded rods.
      a. Exposed track soffit: Track soffit to be integral to track shape and shall be powder-coated off white paint finish. Track must accommodate termination of plenum sound barriers on both sides of track for maximum sound control.
   2. Carriers: One trolley in alternating panels with 3-inch (76.2 mm) diameter glass reinforced nylon, all steel precision-ground ball-bearing wheels. Steel wheeled or reinforced polymer trolleys on aluminum track not permitted. Trolleys shall attach to panels with 1/2-inch (12.7 mm) diameter pendent bolt mounted to welded steel mounting plate.

2.7 OPTIONS

A. Available accessories/options:

B. Single Pass Doors:
   1. Matching pass door same thickness and appearance as the panels. ADA compliant pass door to be trimless and equipped with friction latch and flush pulls for panic operation. No threshold will be permitted.
   2. Matching pass door same thickness and appearance as the panels. ADA compliant pass door to be trimless and equipped with friction latch and flush pulls for panic operation. No threshold will be permitted.
   3. Automatic door closures.
   4. Self-Illuminated exit signs.

C. Work Surfaces shall be as indicated on drawings
   1. Markerboard: White porcelain enamel on steel, bonded to the face of the panel with horizontal and vertical trim without exposed fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, Drawings and approved Shop Drawings.

B. Install operable partitions and accessories after other finishing operations, including painting have been completed.

C. Match operable partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.

D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

3.3 CLEANING AND PROTECTION

A. Clean partition surfaces upon completing installation of operable partitions to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer and Installer that insure operable partitions are without damage or deterioration at time of Substantial Completion.

3.4 ADJUSTING

A. Adjust operable partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.5 DEMONSTRATION

A. Demonstrate proper operation and maintenance procedures to Owner's representative.

B. Provide Operation and Maintenance Manual to Owner's representative.

END OF SECTION 10 22 26

SECTION 10 28 13 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Washroom accessories.
   2. Shower Accessories.
   3. Underlavatory guards.
   4. Custodial accessories.

B. Related Sections
   1. Section 10 14 00 - Interior Signs, for restroom signs.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:
   1. Construction details and dimensions.
   2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Material and finish descriptions.
   4. Features that will be included for Project.
   5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated on Drawings.
   2. Identify products using designations indicated on Drawings.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 WASHROOM ACCESSORIES

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:
   1. Bobrick Washroom Equipment, Inc.
   2. American Specialties, Inc.
   3. Bradley Corporation.

B. Grab Bar
   1. Mounting: Flanges with concealed fasteners.
   2. Material: Stainless steel.
      a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.
   3. Outside Diameter: 1-1/2 inches.
   4. Configuration and Length: As indicated on Drawings.
   5. Grab Bars and fasteners shall be capable of supporting a 250 pound load applied in any direction, anywhere along the length of the grab bar.

C. Angle Frame Mirror Unit:
   1. Frame: Stainless-steel angle, 0.05 inch thick.
      a. Corners: Welded and ground smooth.
   2. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
      a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
   3. Size: as indicated on Drawings.

2.2 SHOWER ROOM ACCESSORIES

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:
   1. American Specialties, Inc. (A.S.I.)
   2. Bobrick Washroom Equipment, Inc.
   3. Bradley Corporation.

B. Shower Curtain Rod:
   1. Description: 1-1/4-inch OD; fabricated from nominal 0.05-inch- thick stainless steel.
   2. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
   3. Finish: No. 4 (satin).

C. Shower Curtain:
   1. Size: Minimum 12 inches wider than opening by 72 inches high.
   2. Material: Vinyl, minimum 0.006-inch- thick, opaque, matte.
   3. Color: White.

4. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
5. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

D. Folding Shower Seat:
1. One piece solid phenolic seat with folding stainless steel frame.
2. Provide reversible seat or field verify handing before ordering.

2.3 UNDERLAVATORY GUARDS

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:
1. Plumberex Specialty Products, Inc.
2. TCI Products.
3. Truebro, Inc.

B. Underlavatory Guard:
1. Description: Insulating pipe covering for supply and drain piping assemblies, that prevent direct contact with and burns from piping, and allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded-plastic, white.

2.4 CUSTODIAL ACCESSORIES

A. Mop and Broom Holder:
1. Description: Unit with holders.
2. Length: 36 inches.
3. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

2.5 ACCESSIBLE RESTROOM SIGNS

A. Molded plastic with Grade 2 Braille, white on blue background, nominal 6 inches wide by 9 inches high. Provide minimum one inch high letters.

B. Rockwood Manufacturing Company,
1. Men: BFM687.
2. Women: BFM688.
3. Unisex: BFM689.

C. Seton Identification Products
1. Men: #84578.
2. Women: #84579.
3. Unisex: #84580.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 SCHEDULE

Description	Bobrick	A.S.I.	Bradley
Mirror (3/4 x 3/4 angle frame) (ref. dwgs for size)	B-290	0600	780
Grab Bar (42”)	B-6806.99 x 42	3800P	81222
Grab Bar (36”)	B-6806.99 x 36	3800P	81222
Grab Bar (18") Vertical	B-6806.99 x 18	3800P	81222
Grab Bar Shower	B-6861.99	3800P	8122-059 1533

Description	Bobrick	A.S.I.	Bradley
Shower Rod (ref. dwgs for length)	B-6047	1204	9531
Shower Curtain Rings	204-1	1200-SHU	9536
Shower Curtain (ref. dwgs for size)	204-3	1200-V	9533
Shower Seat (ref. dwgs for handing)	B-5181	8206-L or 8206-R	9569
NapkinTampon Disposal (surface mount)	B-254	0473-A	4722-15
Coat Hook, Sgl Satin	B-76717	7340-S	9114
Broom/Mop Holder	B-223x24	8215-3	9953
Soap Dispenser	Owner provided, Contractor installed		
Paper Towel Dispenser	Owner provided, Contractor installed		
Toilet Paper Dispenser	Owner provided, Contractor installed		

END OF SECTION 10 28 13

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Fire Extinguishers.
   2. Fire Extinguisher Cabinets.
   3. Rapid Entry System Cabinet (Knox Box)
   4. Accessories.

B. Related Sections include the following:
   1. Division 21 Section "Water-Based Fire-Suppression Systems" for hose systems, racks, and valves.

1.3 REGULATORY REQUIREMENTS

A. Comply with National Fire Protection Association (NFPA) Standard No. 10, Portable Fire Extinguishers, for extinguishers and operation and maintenance data.

B. Provide Underwriter's Laboratories (UL) listed fire extinguishers bearing mark for type, rating, and classification indicated.

1.4 QUALITY ASSURANCE:

A. Single Source Responsibility: Obtain products in this section from one manufacturer.

B. UL-Listed Products: Provide new portable fire extinguishers which are UL - listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

C. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

D. For fire-rated cabinets, submit UL number or approved testing information which verifies the cabinet can be used in the application indicated without reducing the integrity of the fire wall.

1.5 SUBMITTALS

A. Submit product data for the following:
   1. Fire Extinguisher

2. Fire Extinguisher Cabinets.
3. Mounting Brackets.
4. Knox Boxes.

B. Product Data: Submit product data for each type of product included in this section. For fire extinguisher cabinets include roughing-in dimensions and details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, and panel style and materials.

C. Submit manufacturer's installation instructions.

D. Shop drawings shall include the following note completed and signed by the Contractor:
   1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.6 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data.

B. Include test, refill or recharge schedules, procedures, re-certification requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. J. L. Industries, Inc.; a Division of Activar Construction Products Group.
   2. Larsen's Manufacturing Company.
   3. Potter Roemer LLC.

2.2 FIRE EXTINGUISHERS

A. Fire extinguishers: multi-purpose dry chemical ABC type.
   1. Rating/Size Typical: UL Rating of 4A-60BC minimum, nominal 10 pound.

B. Fire extinguishers: wet chemical, Type K.
   1. Rating/Size: 6 liter (1.6 gallon)

2.3 FIRE EXTINGUISHER CABINETS

A. General: Provide the following features:
1. All steel construction, with white enamel interior finish and primed exterior.
2. Cabinet with a flush pull.
3. Vertical View panel glazed door with 1/4 inch thick acrylic plexiglass glazing.
4. Fire rated cabinet tubs in 1 and 2 hour rated walls.
5. Locking mechanism that allows door to be opened without breaking glass.
a. J. L. Industries, Inc. SAF-T-LOC.
b. Larsen's Mfg. Co. LARSON-LOC.

B. Semi-recessed (8 inch C.M.U. and metal stud): semi-recessed with rolled edge return trim and options specified above.
1. J. L. Industries, Inc. – Series 1017 / 1017 FX.
2. Larsen's Mfg. Co. – Series 2409 / FS2409 (Fire Rated).

C. Recessed (12 inch C.M.U.): flat trim and options specified above.
1. J. L. Industries, Inc. – Series 1015 / 1015G FX.
2. Larsen's Mfg. Co. – Series 2409 / FS 2409 (Fire Rated).

2.4 EXTINGUISHER BRACKETS

A. Provide manufacturer's standard bracket designed to prevent accidental dislodgement of extinguisher, of sizes required for type and capacity of extinguisher indicated, in manufacturer's standard plated finish. Provide brackets for extinguishers not located in cabinets.
1. Fire Extinguisher Sign: at bracket mounted fire extinguishers, provide one sign per unit, similar to J. L. Industries, Inc. model RP108.

2.5 FIRE DEPARTMENT RAPID ENTRY SYSTEM CABINETS

A. Knox-Box 3200 Series High Security Commercial Key Box manufactured by Knox Company, Irvine California.
1. Provide one (1) unit with Hinged Door, and Recessed Mounting Kit (RMK) for mounting on the building at location to be determined.
2. Confirm acceptability of cabinets with Fire Department having jurisdiction prior to acquisition and installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify rough openings for cabinets are correctly sized and located according to

plans and in locations acceptable to the authority having jurisdiction.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions applicable to products and application indicated.

B. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities so that the bottom of the extinguisher is not above 44 inches above finish floor.

C. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

D. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

E. Fire Rated Cabinets (if applicable): At all locations where cabinets are installed in rated walls, and the integrity of the rated wall is not maintained by wall itself where the cabinet is recessed or semi-recessed into it, provide approved fire-rated cabinet constructed to maintain the integrity of the wall into which it is inserted.

F. Build-in rapid entry cabinets as work progresses. Verify location and mounting height with local authorities.

3.3 PROTECTION

A. Protect installed materials from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where material is subject to abuse.

END OF SECTION 10 44 00

SECTION 10 51 13 – METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Knocked-down, Full Height, quiet metal lockers, 6 inch legs with closure panels and continuous sloped top.
   2. Knocked-down, 2 tier, quiet metal lockers, 6 inch legs with closure panels and continuous sloped top.
   3. Personal Effects Lockers: Knock-down, 6 tier, metal lockers, 6 inch legs with closure panels and continuous sloped top.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Show base sloping tops filler panels and other accessories.
   2. Include locker identification system.

C. Samples for Initial Selection: For units with factory-applied color finishes.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative of metal locker manufacturer for installation and maintenance of units required for this Project.

B. Source Limitations: Obtain metal lockers and accessories through one source from a single manufacturer.

C. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Regulatory Requirements: Where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
   1. Provide hardware that does not require tight grasping, pinching, or twisting of the wrist, and that operates with a force of not more than 5 lbf.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for metal locker installation.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify the following by field measurements before fabrication and indicate measurements on Shop Drawings:
   1. Concealed framing, blocking, and reinforcements that support metal lockers before they are enclosed.
   2. Recessed openings.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS) Type B, suitable for exposed applications.

B. Fasteners: Zinc- or nickel-plated steel, slotless-type exposed bolt heads, and self-locking nuts or lock washers for nuts on moving parts.

C. Anchors: Select material, type, size, and finish required for secure anchorage to each substrate.
   1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and at Locker/Shower Rooms for corrosion resistance.
   2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.2 FULL HEIGHT METAL LOCKERS

A. Full Height (refer to drawings for actual locker height) quiet metal lockers: acceptable manufacturers include;
   1. ASI Group; Storage Solutions
   2. Penco Products, Inc., Subsidiary of Vesper Corporation; Guardian Plus Lockers.
   3. List Industries Inc.
   4. Lyon Workspace Products; Standard Lockers.
   5. Tennsco Corp.; Tennsco Lockers.

B. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated, cold-rolled steel sheet with thicknesses as follows:

1. Tops, and Intermediate Dividers: 0.0209 inch (min), with single bend at sides.
2. Backs and Sides: 0.0209 inch thick (min), with full-height, double-flanged connections.
3. Shelves: 0.0209 inch thick (min), with double bend at front and single bend at sides and back.
4. Bottom: 0.028 inch thick (min), with double bend at front and single bend at sides and back. Bottom must be installed with a bolted connection. Riveting is not acceptable.

C. Frames: Channel formed; fabricated from 0.0528-inch- thick, cold-rolled steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.

D. Doors: One-piece; fabricated from 0.074-inch thick, cold-rolled steel sheet; formed into channel shape with double bend at vertical edges, and with right-angle single bend at horizontal edges.
1. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.0428-inch- thick, cold-rolled steel sheet; welded to inner face of doors.
2. Door Style: Unperforated panel.
a. Concealed Vents: Slotted perforations in top and bottom horizontal return flanges of doors.

E. Hinges: Self-closing; welded to door and attached to door frame with not less than 2 factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Hinges: Manufacturer's standard, steel continuous or knuckle type.

F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry resistant.
1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic and prelocking.
a. Latch Hooks: Equip doors less than 48 inches high with 2 latch hooks; fabricated from minimum 0.0966-inch- thick steel; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
b. Latching Mechanism: Manufacturer's standard rattle-free latching mechanism and moving components isolated with vinyl or nylon to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.

G. Locker Base: 6 inch legs with solid front and end filler panels.

H. Combination Padlocks: Provided by Owner.

I. Equipment: Equip each metal locker with identification plate and the following, unless otherwise indicated:
1. One double-prong ceiling hook and two single-prong wall hooks.

J. Accessories:
   1. Filler Panels: Fabricated from cold-rolled steel sheet, manufacturer's standard thickness, but not less than 0.0528 inch thick.
   2. Continuous Sloping Tops: Fabricated from cold-rolled steel sheet, manufacturer's standard thickness, but not less than 0.0329 inch thick.
      a. Closures: Vertical-end type.
   3. Boxed End Panels, if required: Fabricated from 0.0528-inch- thick, cold-rolled steel sheet.

K. Finish: Baked enamel or powder coat.
   1. Color(s): As selected by Architect from manufacturer's full range.

2.3 DOUBLE TIER METAL LOCKERS

A. Double tier quiet metal lockers: acceptable manufacturers include;
   1. Penco Products, Inc., Subsidiary of Vesper Corporation; Guardian Plus Lockers.
   2. List Industries Inc.
   3. Lyon Workspace Products; Standard Lockers.
   4. Tennsco Corp.; Tennsco Lockers.

B. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated, cold-rolled steel sheet with thicknesses as follows:
   1. Tops, and Intermediate Dividers: 0.0209 inch, with single bend at sides.
   2. Backs and Sides: 0.0209 inch thick, with full-height, double-flanged connections.
   3. Shelves: 0.0209 inch thick, with double bend at front and single bend at sides and back.
   4. Bottom: 0.028 inch thick with double bend at front and single bend at sides and back. Bottom must be installed with a bolted connection. Riveting is not acceptable.

C. Frames: Channel formed; fabricated from 0.0528-inch- thick, cold-rolled steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.

D. Doors: One-piece; fabricated from 0.074-inch thick, cold-rolled steel sheet; formed into channel shape with double bend at vertical edges, and with right-angle single bend at horizontal edges.
   1. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.0428-inch- thick, cold-rolled steel sheet; welded to inner face of doors.
   2. Door Style: Unperforated panel.
      a. Concealed Vents: Slotted perforations in top and bottom horizontal return flanges of doors.

E. Hinges: Self-closing; welded to door and attached to door frame with not less than 2 factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
   1. Hinges: Manufacturer's standard, steel continuous or knuckle type.

F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry resistant.
   1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic and prelocking.
      a. Latch Hooks: Equip doors less than 48 inches high with 2 latch hooks; fabricated from minimum 0.0966-inch- thick steel; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
      b. Latching Mechanism: Manufacturer's standard rattle-free latching mechanism and moving components isolated with vinyl or nylon to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.

G. Locker Base: 6 inch legs with solid front and end filler panels.

H. Combination Padlocks: Provided by Owner.

I. Equipment: Equip each metal locker with identification plate and the following, unless otherwise indicated:
   1. One double-prong ceiling hook and two single-prong wall hooks.

J. Accessories:
   1. Filler Panels: Fabricated from cold-rolled steel sheet, manufacturer's standard thickness, but not less than 0.0528 inch thick.
   2. Continuous Sloping Tops: Fabricated from cold-rolled steel sheet, manufacturer's standard thickness, but not less than 0.0329 inch thick.
      a. Closures: Vertical-end type.
   3. Boxed End Panels, if required: Fabricated from 0.0528-inch- thick, cold-rolled steel sheet.

K. Finish: Baked enamel or powder coat.
   1. Color(s): As selected by Architect from manufacturer's full range.

2.4 SIX TIER METAL LOCKERS

A. Six Tier metal lockers: 12 x 12 x 72 inches, plus 4 inch Zee base.
   1. Penco Products, Inc., Industrial Manufacturing Company; Vanguard Lockers.
   2. List Industries Inc.
   3. Lyon Workspace Products; Standard Lockers.
   4. Republic Storage Systems Company.

B. Accessories:
   1. Continuous Zee Base: Fabricated from cold-rolled steel sheet, manufacturer's standard thickness, but not less than 0.0528 inch thick.
      a. Height: 4 inches.
   2. Boxed End Panels: Fabricated from 0.0528-inch- thick, cold-rolled steel sheet.

C. Finish: Baked enamel or powder coat.

1. Color(s): As selected by Architect from manufacturer's full range.

2.5 FABRICATION

A. General: Fabricate metal lockers square, rigid, and without warp; with metal faces flat and free of dents or distortion. Make exposed metal edges free of sharp edges and burrs, and safe to touch.
   1. Form body panels, doors, shelves, and accessories from one-piece steel sheet, unless otherwise indicated.
   2. Provide fasteners, filler plates, supports, clips, and closures as required for a complete installation.

B. Knocked-Down Construction: Fabricate metal lockers for nominal assembly at Project site using nuts, bolts, screws, or rivets. Nuts and bolts must be used to install the bottom most shelf within each double tiered locker unit.

C. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.

D. Identification Plates: Manufacturer's standard etched, embossed, or stamped aluminum plates; with numbers and letters at least 3/8 inch high.

E. ontinuous Base: Formed into channel or Z profile for stiffness, and fabricatedin lengths as long as practicable to enclose base and base ends of metal lockers; finished to match lockers.

F. Continuous Sloping Tops: Fabricated in lengths as long as practicable, without visible fasteners at splice locations; finished to match lockers.

G. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip joint filler angle formed to receive filler panel.

2.6 STEEL SHEET FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.

C. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond. Use manufacturer's standard methods.

D. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard baked-polymer thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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

3.2 INSTALLATION

A. General: Install level, plumb, and true; shim as required, using concealed shims.
   1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion, using concealed fasteners.
   2. Anchor single rows of metal lockers to walls near top of lockers and to floor.

B. Knocked-Down Metal Lockers: Assemble knocked-down metal lockers with standard fasteners, with no exposed fasteners on door faces or face frames.
   1. Nuts and bolts must be used to install the bottom most shelf within each double tiered locker unit.

C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
   1. Attach hooks with at least two fasteners.
   2. Attach door locks on doors using security-type fasteners.
   3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
      a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
   4. Attach filler panels with concealed fasteners. Locate fillers panels where indicated on Drawings.
   5. Attach sloping top units to metal lockers, with closures at exposed ends.
   6. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed metal lockers.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

B. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit metal locker use during construction.

C. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal locker manufacturer.

END OF SECTION 10 51 13

SECTION 10 82 13 – ALUMINUM ROOF SCREEN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Stand-alone roof equipment screens and supporting steel framework. Screens shall be designed to attach to the roof structure and not the equipment being screened

A. Roof screen accessories

1.3 RELATED SECTIONS

A. Section 033000 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.

B. Division 04 - Masonry Anchorage and Reinforcement: Installation of anchors.

C. Division 05 - Structural Steel: Metal Framing.

D. Division 05 - Steel Floor Deck.

E. Division 05 - Metal Fabrications: Frames and supports

F. Section 077213 - Roof Curbs.

G. Section 099100 - Paints and Coatings: Field applied paint finish.

H. Division 23 - Roof Top HVAC Equipment

1.4 REFERENCES

A. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

D. ASTM A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

E. ASTM B 749 - Standard Specification for Lead and. Lead Alloy Strip, Sheet, and Plate Products.

F. ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing.

G. ASTM D 6878 - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing.

H. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

J. AWS D1.1 - Structural Welding Code - Steel.

K. AWS D1.6 - Structural Welding Code - Stainless Steel

1.5 SUBMITTALS

A. Product Datacenter
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for roof screen system.

B. Shop Drawings
   1. Include typical dimensioned cross-section(s) indicating
      a. Dimensions as shown on the drawings.
      b. Finish as shown on the drawings.
      c. Samples: For each exposed product and for each color and texture specified.
         1) Size: 12 inches
   2. Provide Qualification of Installers

C. Design Calculations: 3 copies of structural design calculations for structural components and components resisting wind loads with seal and signature of professional engineer licensed in the State of Tennessee.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

F. Warranties: 3 signed copies

G. Shop drawings shall include the following note completed and signed by the Contractor:

1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

B. Manufacturer Qualifications: Manufacturer with a minimum five years documented experience in producing pre-manufactured metal-framed equipment screens.

C. Design Qualifications: Provide structural design calculations stamped by a professional engineer licensed in the state in which this project is located.

D. Welders: AWS certified within previous 12 months.

E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Locate in area designated by Architect.
   2. Construct mock-up, one full screen section wide, including two roof supports.
   3. Do not proceed with remaining work until workmanship, color, and location is approved by Architect.
   4. Remove mock-up if required by Architect.
   5. Accepted mock-up may remain in place.

1.7 PRE-INSTALLATION MEETINGS

A. Conduct the conference at the job site on a date and time set a minimum of 2 weeks in advance of beginning work.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, Installer, system manufacturer's representative, roofing Installer, and installers whose work interfaces with or affects the wall transition to the windows.
   2. Review methods and procedures related to installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine substrate and surrounding conditions and finishes for compliance with requirements, including flatness and fastening.
   5. Review structural loading limitations of walls and windows during and after installation.

B. Review governing regulations and requirements for insurance and certificates if applicable.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle and store materials in conformance with the manufacturers printed instructions.

B. Store products under cover, in manufacturer's unopened packaging until ready for installation.

C. Protect materials from exposure to moisture.

D. Store materials in a dry, warm, ventilated weathertight location.

E. Protect metal fabrications from damage by exposure to weather.

F. Handling: Use a forklift or crane to move material. Do not lift the bundles by the metal bands.
   1. Fork Lift: Spread the forks as far as possible to balance the load. Drive slowly when moving long bundles over uneven surfaces to avoid tipping the load
   2. Crane: Position the canvas sling straps so that the space between the straps is at least 1/3 the length of the bundle. Use sling straps with looped ends running one end of the strap through the loop at the other end to cinch the bundle when lifted. When setting the load on the roof, put wood blocks under it to protect the roof and allow space to remove the sling straps.
   3. Roof Placement: Spread the bundles and crates out as much as possible to avoid overloading the roof structure. Place the material directly over major supports such as beams or trusses.
   4. Position bundles of tubing parallel to the slope of the roof and block prior to opening to prevent the tubing from rolling down the roof slope when unbundled.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Field Measurements: Verify roof screen dimensions and conditions of the installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating equipment enclosure without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions

1.10 WARRANTY

A. A. Framing System: Provide manufacturer's standard written limited warranty stating that the complete framing system shall be warranted against structural

failure due to cracking, buckling, bending, tearing or corrosion arising under normal use and environmental conditions for the coverage period applicable.

1. Products installed on projects located 2 miles or greater from salt or brackish bodies of water shall be warranted for twenty (20) years
2. Products installed on projects located greater than 1 mile but less than 2 miles from salt or brackish bodies of water will be warranted for five (5) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years.
3. Products installed on projects located 1 mile or less from salt or brackish bodies of water will be warranted for three (3) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years.

B. Angled Louver Finish:

1. Provide written warranty stating that the paint finish applied on all equipment enclosure louvers will warranted against chipping, peeling, cracking, fading, or blistering in accordance with the General Conditions for the coverage period of twenty (20) years.
2. Provide warranty signed by the louver manufacturer and paint finish applicator (if separate from manufacturer).

C. The above warranties are in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Design Loads: Comply with Building Code for site location and building height.

1. Design to resist ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
2. Design all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.

B. Structural Design: Prepare structural design calculations for screen framing and attachment to structure including reactions at base supports for verification of roof structure by Architect.

C. All welds to be performed by an AWS certified welder. Valid certification to be provided.

2.2 MANUFACTURERS

A. Manufacturers, basis of design: Product specifications are based upon the first named manufacturer. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. RoofScreen Mfg

B. Substitutions will only be permitted if the procedures are followed in Division 01.

2.3 MATERIALS

A. Square Base Supports: Weldments fabricated from cold rolled steel conforming to ASTM A 1008, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil baked on powder coat primer.
   1. Height 12 inches (305 mm).

B. Square Base Support Extensions: Fabricated from same material and finish as base supports.
   1. Height 4 inches (101 mm).

C. Square Base Cap: Weldments fabricated from cold rolled steel conforming to ASTM A 1008 and fabricated to overlap base support and flashing boot a minimum of 2 inches (51 mm). Provide moment resisting sprocket connection to attached framing to base cap. After fabrication finish as follows:
   1. Powder coat, minimum 2-4 mils baked on.

F. Roof Flashing: Refer to Division 07 section that specifies the roof membrane.

G. Base Cap Gasket: EPDM with self-adhesive closed cell foam.

H. Framing: Carbon steel structural tubing in manufacturer's standard sizes, conforming to ASTM A 500 with manufacturer's standard galvanized coating conforming to ASTM B 117 salt spray testing. Provide with wall thickness as determined by structural calculations.

I. Connector Fittings: Fabricated from cold rolled steel conforming to ASTM A 1008. After fabrication, apply zinc plating conforming to ASTM B 633 Type 1, then baked on powder coating minimum 2 to 4 mil Cardinal Industrial Finishes, P004-BK02.

J. Steel Z section: Steel sheet conforming to ASTM A 653, Class SS, with a G90 hot-dip galvanized coating.

K. Hardware: Bolts, nuts, washers and screws 18-8 stainless steel.

L. Welding Materials: AWS D1.1; type required for materials being welded.

M. Louver:
   2. Profile:
      a. 6" (measured vertically) louver
   2. Base Metal:
      H. Minimum 26 gauge Galvalume steel sheet, AZ50, conforming to ASTM A 792 for painted louvers.
   3. Finish:
      C. Color as selected by Architect from manufacturer's standard color range, 20 colors minimum.
      D. Coat reverse side with off-white primer coat.
   4. Louver Fasteners: No. 14 self-tapping sheet metal screw. Color coat heads to match louver color.

1. Louver Trim: Same material and finish as louver. Configuration as shown on Drawings

1.2 FABRICATION

A. Fabricate ends of tubing with flat crimp for connections.

B. Fit and shop assemble items in largest practical sections, for delivery to site.

C. Fabricate items with joints tightly fitted and secured.

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. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Fabricate system components so that portions of screen can be dismantled for repairs to equipment being screened and for future roof replacement.

PART 3 - EXECUTION

3.3 EXAMINATION

A. Examine area where work will be installed to verify the installation can be performed in accordance with the Drawings and structural calculation requirements without interference from other equipment or trades.

B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Do not begin installation until conditions have been properly prepared

3.4 PREPARATION

A. Protect surrounding and adjacent work as required preventing damage to preceding work during execution of this work.

B. Perform all preparation necessary for a successful installation of products as specified in manufacturer’s installation instructions.

3.5 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Provide for erection loads, and for sufficient temporary bracing to maintain indicated alignment until completion of erection and installation of permanent attachments.

D. Anchor fabrications to structure as indicated.

E. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape to eliminate possibility of corrosive or electrolytic action between metals.

F. Exercise care when installing components so as not to damage finish surfaces. Touch up as required to repair damaged finishes.

G. Install flashing boots at base supports as required to provide a watertight connection. Install as recommended by the roof membrane manufacturer.

H. Remove all protective masking from material immediately after installation

3.6 FIELD QUALITY CONTROL

A. After installation, check all work for flaws and defects.

B. Repair all defective work.

C. Remove and replace all damaged components that cannot be successfully repaired as determined by Project Architect

3.7 PROTECTION

A. Remove all protective masking from framing and trim material immediately after installation. Remove temporary protective coverings and strippable films, if any, as metal louvers are installed, unless otherwise indicated in manufacturer's written installation instructions. Maintain in a clean condition during construction.

B. Protect installed products until completion of project.
   1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
   2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.

C. Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.

D. Replace metal louvers and framing members that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures

END OF SECTION 10 82 13

SECTION 11 13 19 - LOADING DOCK EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work covered by this section includes furnishing and paying for all materials, labor, equipment, licenses, taxes and other items required for execution and completion of all work under this section.

B. The work described in this section of the specifications includes, but is not limited to the following:
   1. Hydraulic Dock Levelers
   2. Dock Bumpers.

C. Related Sections containing requirements related to this section:
   1. Division 3 Section "Cast-in-Place Concrete" for concrete work at dock levelers.
   2. Division 5 Section "Miscellaneous Metal Fabrications" for curb angles at the edge of the loading dock and around the edge of the dock leveler pit.
   3. Division 26 Sections for electrical wiring and connections for loading dock equipment.

1.3 RELATED DOCUMENTS

A. Applicable provisions of the General conditions, supplementary Conditions and Division 1, General Requirements apply to the work under this section.

1.4 APPLICABLE STANDARDS

A. American National Standards Institute (ANSI) - Manual MG30.1, For the Safety, Performance and Testing of dock Leveling Devices - Specifications. (Copies of the test specification may be obtained from the LODEM (Loading Dock Equipment Manufacturers organization, 8720 Red Oak Blvd., Suite 201, Charlotte, NC 38217-3992).

B. American Institute of Steel Construction - Steel Construction Manual, Part V. (Copies of the Steel Construction Manual may be obtained from the American Institute of Steel Construction, 101 Park Avenue, New York, NY 10017).

1.5 SUBMITTALS

A. General: Submit the following according to the general provisions of the contract and Division 1 Specifications.

B. Product Data for each type of loading dock equipment specified, including details of construction relative to materials, dimensions of individual components, profiles and finishes.
   1. Include rated capacities of each loading dock leveler required.

C. Shop drawings detailing fabrication and installation of loading dock equipment. Include plans, elevations, and large-scale details showing layout and types of equipment required. Show anchorages and accessory items.
   1. Provide location template drawings for items supported or anchored to permanent construction.
   2. Furnish roughing-in drawing for electrical service well in advance of concrete work.

D. Material test reports from a qualified independent testing agency indicating compliance of dock levelers with requirements of ANSI MH30.1 for determining rated capacity indicated.

E. Maintenance data for loading dock equipment to include Operating and maintenance Manual specified in Division 1. Include name, address, and telephone number of the manufacturer's nearest authorized service representative.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the loading dock equipment manufacturer for both installation and maintenance of the type of equipment required for this project.
   1. Maintenance proximity: Not more than 2 hours normal travel time from the Installer's place of business to the Project site.

B. Manufacturer Qualifications: A firm experienced in manufacturing loading dock equipment similar to that indicated for this Project and that has a record of successful in-service performance.
   1. Acceptable manufacturers include:
      a. Kelley Dock Equipment
      b. Rite-Hite Corporation, Frommelt
      c. Serco manufacturing.
      d. Pentalift Equipment Corp.

C. Dock Leveler Standard: comply with applicable requirements of ANSI MH30.1 for construction and operation of dock levelers.

D. Single Source Responsibility: Obtain each loading dock equipment component, including dock bumpers and dock levelers, as a complete unit produced by a single manufacturer, including necessary accessories, fittings and anchorages.

1.7 DELIVERY, HANDLING, STORAGE

A. Deliver products with labels identifying project name, site location, and factory order or reference numbers. Dock bumpers are to be banded together and to the frame of the leveler. The control panel shall be delivered in a separate box, with

labels identifying project name, site location, electrical characteristics, and factory order or reference numbers, and protected by applicable wrapping. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.8 WARRANTIES

A. Dock Leveler Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace loading dock equipment components that fail in materials or workmanship within the specified warranty period. Failures include but are not limited to:
   1. Structural failures, including excessive deck surface deflection.

B. Warranty Period: 10 Years from the date of Substantial completion.

C. The warranty shall not deprive the Owner of the other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 HYDRAULIC DOCK LEVELER

A. General - Provide dock levelers of type, function, operation, capacity, size and construction indicated, complete with controls, safety devices and accessories required.

B. Type: Provide recessed, hinged-lip type dock levelers designed for permanent installation in concrete pits, preformed in the edge of the loading platform at the location indicated.

C. Function: dock levelers shall compensate for differences in height between the truck bed and the loading platform in the following manner.
   1. Vertical Travel: Minimum working range shall be 12 inches above and 12 inches below the adjoining platform level for dock leveler ramps. Provide an operating range above the platform level of sufficient height to enable the lip to extend and clear the truck bed before contact.
   2. Automatic Vertical Compensation: Floating travel of the ramp with lip extended and resting on the truck bed shall compensate automatically for upward or downward movement of the truck bed during loading and unloading.
   3. Automatic Lateral Compensation: Tilting of the ramp with lip extended and resting on the truck bed shall compensate automatically for canted truck beds of up to 4 inches over the width of the ramp.
   4. Lip Operation: Provide the manufacturer's standard mechanism that automatically extends and supports the hinged lip on the ramp edge with the lip resting on the truck bed over the dock leveler's working range, allows

the lip to yield under impact of the incoming truck, and automatically retracts the lip when the truck departs.

a. Length of lip extension shall be not less than 20 inches from ramp edge and not less than 16 inches in front of the dock bumpers.

5. Automatic Ramp Return: Provide automatic ramp return of the unloaded ramp, from raised or lowered positions to stored position, level with the platform, as the truck departs.

D. Operation: Provide the manufacturer's standard operating system as follows:

1. Mechanical Operating System: Manual control; counterbalance and spring operation. Spring-operated raising and walk-down lowering of unloaded ramp. Equip leveler with an upward-biased-spring counterbalancing mechanism controlled by a hold-down device. Ramp raises to top limit of operating range by operating recessed control handle in ramp to disengage hold-down device. Ramp lowers below platform level with lip retracted by operating auxiliary, recessed control handle to release support legs.

a. Free-Fall Protection: Manufacturer's standard protection system to limit free fall of loaded ramps with front edge supported by truck bed.

E. Rated Capacity: Provide dock levelers capable of supporting a gross moving load of 25,000 pounds minimum without permanent deflection or distortion, as determined by actual tests complying with the requirements of ANSI MH30.1 for rated capacity of fixed dock boards.

F. Size: Provide dock levelers of 7 feet wide by 8 feet long.

G. Safety Devices: Provide the manufacturer's standard and optional safety devices as follows:

1. Toe Guards: Protect open sides of the rising ramp over the entire upper operating range with metal toe guards mounted flush with the ramp edges and projecting below the ramp.

H. Safety Inspection Leg: Provide integral strut to positively support the ramp in the up position during maintenance of the dock leveler.

I. Construction: Fabricate dock leveler as follows:

1. Ramp Platform: The surface of the platform shall be continuous and of non-skid type raised pattern treadplate. The thickness of the steel plate shall be sufficient to meet specified performance requirements. In addition, the platform shall be sufficiently rigid to accommodate concentrated wheel loads at rated capacity without becoming so deformed as to affect the function of the equipment. The steel plate shall be mounted on, and attached to, the top surface of its structural members. The structural members of the platform shall be of such form, number, and strength as to meet specified performance requirements, even for extreme out-of-level conditions, and accommodate the use of 3-wheeled fork lift trucks without the placement of additional support member.

2. Lip: The lip shall be formed along the full width of the platform and at the angle required to ensure that it will be parallel with the truck bed and lie flat on it when the platform is 8 inches or more above dock level position. The edge of the lip shall be chamfered to provide minimum practicable

obstruction to the wheels of the servicing fork lift truck. The surface of the lip shall be of non-skid type to match the surface of the platform. The hinged lip section and its supporting subframe shall be steel of proper strength and designed to prevent the lip from deforming during operation or as a result of it. The lip shall act as a protective cover for the lip-actuating mechanism when the ramp is in the horizontal position.

3. Ramp Sides: The sides of the dock ramp which rise above the dock platform shall be provided with skirts or toe guards. The skirts or toe guards shall be attached to the ramp platform, and shall be designed to close the space between the loading platform and the ramp platform throughout the operating range.
4. Frame: The frame shall be constructed of heavy structural steel welded and reinforced as required to meet specified performance requirements and to provide a rigid support for the unit.
5. Activating mechanisms: The ramp-activating mechanism and the lip activating mechanism shall be of rugged construction, to provide safe, dependable operation, with a low-cost maintenance factor. All pivot points shall be readily accessible for lubrication as specified by the manufacturer's suggested maintenance plan.

J. Finish and Color: Provide the manufacturer's standard finish over steel surfaces that have been cleaned and pretreated to obtain optimum paint bond. Paint toe guards yellow to comply with ANSI Z53.1, and paint the remainder of the surfaces in the manufacturer's standard color.

2.2 DOCK BUMPERS

A. Dock bumpers:
1. Nominal size 4 inches deep by 10 inches wide by 18 inches tall, mounted vertically. Size indicated is depth, width and height of rubber portion of dock bumper.
2. Heavy molded-rubber compound reinforced with nylon, rayon, or polyester cord; with Type A Shore durometer hardness of 80, plus or minus 5, when tested according to ASTM D 2240. Provide two dock bumpers for each dock leveler, attached to face of loading dock with expansion bolts.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Coordinate installation of loading dock equipment indicated to be attached to or recessed into concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their installations.
1. Coordinate delivery of anchoring devices to Project site to avoid delaying progress.

3.2 INSTALLATION

A. General: Comply with manufacturer's detailed instructions for installing loading dock equipment.

B. Dock Bumpers: Attach dock bumpers to the structure in a manner that complies with requirements indicated for spacing, arrangement, and position relative to top of platform and anchorage.
   1. Welded Attachment: Plug-weld anchor holes in contact with steel inserts and fillet-weld at other locations.
   2. Bolted Attachment: Attach dock bumpers to preset anchor bolts embedded in concrete or to cast-in-place inserts or threaded studs welded to embedded steel plates or angles. If preset anchor bolts, cast-in-place inserts or threaded studs welded to embedded plates or angles are not provided, attach dock bumpers by drilling and anchoring with expansion anchors and bolts.

C. Dock Levelers: Coordinate forming the pit for dock levelers to ensure that the recess is adequate to accommodate the leveler in proper relationship to the loading platform. Attach leveler securely to the loading platform construction according to the manufacturer's directions.

3.3 QUALITY ASSURANCE PROVISIONS

A. Manufacturer's Inspection and Testing: The manufacturer shall perform all inspection and testing necessary to ensure the proper construction and operation of the dock leveler. The inspections shall include, as a minimum, all inspection performed in his normal commercial work. The Architect and Owner reserves the right to witness any inspection or test, and the manufacturer shall give notice to the Architect and Owner one week in advance of test performance.

3.4 ADJUST AND CLEAN

A. Make necessary adjustments for safe, efficient operation of loading dock equipment.

B. After installation, restore marred, abraded surfaces to the original condition.

3.5 DEMONSTRATION

A. Start-up Services: Provide the services of a factory authorized service representative of the manufacturer to provide start-up service and to demonstrate and train the Owner's maintenance personnel.
   1. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
   2. Train the Owner's maintenance personnel on procedures and schedules related to start-up and shutdown, troubleshooting, servicing, and preventive maintenance.
   3. Review data in Operating and maintenance manuals. Refer to Division 1 Section "Project Closeout".
   4. Schedule training with the Owner, through the Project Representative, with at least 7 days advance notice.

END OF SECTION 11 13 19

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

All General Provisions and Sections of the Project Manual, including the AIA General Conditions and Supplementary Conditions & General Requirements; all bidding documents including the Architectural Specifications, Itemized Specifications, Bidding Requirements, Conditions of the Contract, the Contract Documents, all drawings, all Addenda issued and all applicable Divisions of the Architect's Project Manual apply to all the work specified under this Section. Bidder shall examine all other sections and all other drawings including mechanical and electrical drawings for discrepancies and/or conflicts. It is the responsibility of Food Service Equipment Bidder to obtain access to these Project Manuals and drawings.

Each Bidder shall examine the bidding documents carefully and, not later than five (5) days prior to the date for receipt of bids, shall make written request to the Architect for the intent or true meaning of any part of the Contract Documents, or for interpretation or correction of any ambiguity, inconsistency, conflict, discrepancy, omission and/or error that he may discover. Any interpretation, clarification, information, amendment and/or correction is issued as a written Addendum by the Architect. Only a written interpretation or correction by Addendum is binding. No bidder shall rely upon any interpretation or correction given by any other method. Architect will not be responsible for oral interpretations or instructions. Addenda are incorporated, by reference, into the contract. Failure by any bidder to receive any addendum shall not relieve the bidder of any obligation and it is the sole responsibility of each bidder to insure that he has received all addenda. Bidder shall familiarize himself with the site, a complete set of Drawings and Specifications and planned conditions and service connections; his failure to do so shall in no way relieve him of responsibility and no claims for extras shall be allowed in his behalf for failure to do so. Each bidder by submitting his Proposal represents that he has read and understands all the provisions of the Project Manual. Should discrepancies and/or conflicts be discovered after the work has started, the Contractor shall report them to the Architect immediately, and no work connected with the discrepancies and/or conflicts shall be undertaken; or if underway, such work shall be stopped immediately until the Contractor and the Architect agree on the clarification thereof.

If there is any conflict within or between any of the Bidding Documents involving the quality or quantity of work required, it is the intention of the Contract that the work of highest quality, greatest quantity, and greatest expense shown or specified shall be furnished. Whether or not the word "all" is used in the specification, coverage is intended to be complete, except where partial coverage is specifically and expressly noted. In all cases where an item is referred to in the singular number, it is intended that the reference shall apply to as many such items as are required to complete the work.

Each bidder shall visit the site of the Work and/or review all applicable project drawings. Each bidder shall fully inform himself prior to bidding of the conditions and limitations under which the Work is to be performed. He shall include in his bid a sum to cover all costs in order to perform the Work as related to the conditions and limitations. No allowance will be made to any bidder because of lack of such examining knowledge. The submission of a bid will be construed as conclusive evidence that the bidder has made such examination.

1.02 PROJECT FORMS

A. Forms used on this Project (not inclusive) are AIA documents outlined in the Architectural specifications.

B. Within forty-eight (48) hours after written or verbal notification from the Architect or his authorized representative has been received by the General Contractor/Food Service Equipment Contractor, an itemized cost for the food service equipment shall be submitted to the Architect and his Food Service Consultant. With the itemized cost, the Food Service Equipment Contractor is required to identify each items manufacturer and model number as based on the itemized equipment specifications and all addenda. Any applicable bond amounts are entered separately.

1.03 BIDDER RESPONSIBILITY

A. Bidders shall carefully examine the contract and conditions therein affecting work and procedure prior to submitting bids for which contract will be binding.

B. Bonding and Insurance requirements are given in another section of the Project Manual.

C. Instructions for completion of Schedule of Value, Payment Request, etc., are found in a preceding section and are the standard AIA procedure as modified by the Architect.

D. In addition to the progress schedule required by the AIA General Conditions, the Food Service Equipment Contractor also submits his proposed scheme of work for approval, describing proposed sequences of work from beginning to completion of the Work and their correlation with the Owner's specific requirements. Equipment is not delivered, removed from the crates, set-in-place until as a minimum all painting has been completed; ceilings, hood and ventilation duct work are in place; floor is acid cleaned; all rough-in connections are in place. Site must be ready for final connections.

1.04 SCOPE

A. Food Service Equipment Contractor completely furnishes all food service equipment, labor, materials, tools and equipment necessary for the complete installation of kitchen equipment and refrigeration in a first-class manner, including all work incidental thereto in accordance with the drawings and these

specifications.

B. The term "Complete Installation" means the delivery of all kitchen equipment and refrigeration, with transportation and trucking charges prepaid to the building site, removal from crates, assembled, set in place, leveled, ready for final connection, re-leveled, calibrated, started-up and adjusted, demonstrated and training completed. The Food Service Equipment Contractor cleans all equipment using cleaners as recommended by the manufacturers to a condition of sanitation ready and acceptable for food service use. Equipment is cleaned just prior to Owner's acceptance. Any additional requirements are outlined in the Itemized Specifications.

C. Food Service Equipment Contractor's superintendent devotes his full time to this project during installation and must be available to the other trades for verification of connection location, etc. as needed. He labels by Item Number and delivers to other contractors all plumbing and electrical parts that are furnished loose as part of the equipment and counsel with other trades for proper installation. He directs, coordinates and supervises all work under this contract and inspects all equipment under this contract. He ascertains whether or not they comply with the Contract Requirements and immediately rejects all equipment not conforming to the specifications and has them removed from the site.

D. Superintendent shall be experienced in supervision of Food Service Equipment installation of the magnitude and general character of this project. His identity, experience, record, and other qualifying data may be required for approval subject to the discretion of the Architect. Refer to General and Supplementary Conditions for additional requirements.

E. The Food Service Equipment Contractor's project management personnel are subject to the qualifications and responsibilities and approvals as set forth for the superintendent. In addition, the project management personnel coordinate all submittals and Record Documents and insure their compliance with the contract documents.

F. Food Service Equipment Contractor is responsible for leaving equipment with threaded outlets for type of connections as standardized by Food Service Equipment Manufacturers for other contractors to make final steam, plumbing, electric and ventilating connections.

G. This portion of the Contract shall be performed by a competent Food Service Equipment Contractor. Food Service Equipment Contractor shall provide a competent foreman for erection and placing of equipment and to counsel with other contractors.

H. Food Service Equipment Contractor delivers to other contractors for installation all plumbing and electrical parts that are furnished loose and as a part of the equipment and counsel with other trades for proper installation. Parts are labeled by Item Number.

I. Food Service Equipment Contractor erects the equipment at the site in full

compliance with all current local, state and Federal rules, regulations and codes.

J. Food Service Equipment Contractor may attend "Pre-Construction Meeting", and must attend construction meetings and any other scheduled meetings as requested.

K. Food Service Equipment Contractor maintains a full time service representative to handle service problems and must be a factory appointed dealer in distribution for all equipment furnished.

L. If all partitions are erected prior to delivery of Food Service Equipment, bidders are cautioned that all equipment must be fabricated or manufactured to clear through finished door openings and passageways.

M. All labor is performed in the best and most workmanlike manner. The standards of the work required are of such grade as will bring first class results. Materials and/or workmanship not in compliance with the drawings and specifications and/or improperly installed are removed and replaced by the Food Service Equipment Contractor with no change in contract price or other cost to the Owner.

N. Food Service Equipment Contractor cleans up all debris made by his workmen immediately upon completion of installation and removes same from premises.

O. General Contractor supplies Food Service Equipment Contractor electric power at no charge during installation period.

P. Food Service Equipment Contractor is responsible for verifying all measurements on-site and be responsible for same (including shelving and aisle dimensions); verifying and supervising the placement of pipes, sleeves, hood, pant-leg duct, drains, power; the location of doors, walls, columns, ceilings; and the conditions under which the food service equipment is installed etc., prior to the pouring of the floor slab or if in an existing facility prior to the installation of such services. Any modification necessary to the equipment because of the location of service connections must be brought to the attention of the Architect immediately for approval in design changes. Measurements shown on drawings are approximate and are for estimating purposes only. Food Service Equipment Contractor is responsible for verifying all electrical and mechanical requirements for all new, existing and future equipment with all appropriate contractors, sub-contractors, consultants and engineers. Supplier of Food Service Equipment must examine roughed-in mechanical and electrical services; and installation of doors, walls, columns and ceilings and conditions under which the work is to be installed. Notify Architect in writing of unsatisfactory locations and dimensions of other work, and of unsatisfactory conditions for proper installation of Food Service Equipment. Do not proceed with fabrication or installation until unsatisfactory dimensions and conditions have been corrected in a manner acceptable to Architect and Food Service Equipment Contractor. Any costs related to the failure of the Food Service Equipment Contractor in performing this function is at the expense of the Food Service Equipment Contractor.

Q. Field welding, if required, is included in the bid.

R. Work denoted as "Not in Contract" (N.I.C.) or "By Others" or "By General Contractor" in the Food Service Equipment Itemized Specifications will be furnished and installed by contractors on the project other than the Food Service Equipment Contractor. Refer to other sections in bidding document to identify trade responsible.

S. Food Service Equipment Contractor is responsible for verifying all plug types and lengths of all cord and plug sets on equipment for which it is supplied. Length of cord and plug sets must be sufficient for the outlets available and to allow equipment to be placed to prevent easy visibility of receptacles/ cord and plug sets to customers or according to directions in Itemized Specifications. All cord sets are to contain an equipment grounding conductor and be furnished with caps or plugs listed or recognized by Underwriter's Laboratories.

T. Food Service Equipment Contractor confers with the General Contractor on all measurements, location and measurement of recesses and openings, verification of all connection requirements, etc.; coordinate with the General Contractor the scheduling and transfer of all information including measurements, drawings, etc., to be provided by the Food Service Equipment Contractor with all other trades; obtain construction schedule from General Contractor; and confer with General Contractor on scheduled dates of installation based on installation requirements outlined in this Section.

U. Any reference to standard in the Itemized Specifications is supplied whether or not it is identified as standard by the manufacturer.

V. Items identified as "Existing" or "Relocate" are existing equipment to be reused. Owner and/or General Contractor shall disconnect all existing equipment from electrical and mechanical services. Food Service Equipment Contractor shall remove equipment to be reused at time indicated and warehouse it while site is being prepared by other contractors, unless Owner has made other arrangements. Food Service Equipment Contractor provides protection to prevent damage, injury or loss and maintains applicable insurance for all existing equipment stored. Existing equipment is cleaned according to the cleaning instructions included in this section. Refinishing and/or repairs for existing equipment are noted in the General Requirements and Itemized Specifications. Any damage during moving or warehousing is repaired by the Food Service Equipment Contractor at no cost to the Owner. It is the responsibility of the Food Service Equipment Contractor to inspect and note in the presence of the Owner and/or Architect or their duly authorized representative any observable damage to existing equipment before removal. Food Service Equipment Contractor shall deliver and set in place all existing equipment to be reused at the appropriate time.

W. Food Service Equipment Contractor coordinates for all other contractors all requirements found in this section, all other applicable sections, food service equipment drawings and all other applicable drawings.

1.05 PERMITS AND LICENSES

A. The Food Service Equipment Contractor provides proper authorities with notices as required by law relative to work in his charge; obtains and pays all official permits, licenses, etc.; pays proper and legal fees to public officers and others as necessary for faithful performance of the work, and which may arise incidental to fulfilling of these specifications.

B. By submitting a bid, Food Service Equipment Contractor certifies that he holds a business license to permit him to perform Food Service Equipment work in the locale where the work is to be performed, or that he will pay for and obtain such license prior to commencing work, if he is awarded the contract.

1.06 QUALIFICATION OF BIDDERS

A. Food Service Equipment Contractor shall have a valid and current Tennessee Contractor's license.

B. It is required that all fabricated equipment such as food serving units, tables, sinks, counter tops, "etc.," described in the following specifications, other than by name and catalog numbers, be manufactured by an equipment fabricator who has the plant, personnel, and engineering facilities to properly design, detail and manufacture high quality food service equipment. All work in the above category is completed by one manufacturer with standard unit assembly and uniform design and finish.

C. The prospective bidder for the equipment hereafter specified shall be a recognized distributor for these items of equipment.

D. Upon demand, a Food Service Equipment Contractor shall furnish evidence satisfactory to the Architect and Owner of having executed contracts of a size comparable to this Contract and having sufficient experience in the work called for to assure completion of the Contract in a satisfactory manner. He may be required to submit as a minimum the following information to the Architect within five days of receipt of request: Number of years in Food Service Equipment Industry; Key organizational personnel; Credit rating for this contract; Total amount of work under other contracts this date; Certificate of Licensing from Tennessee Licensing Board of General Contractors; past experience in the work called for to assure completion of the work in a satisfactory manner including names of projects, project contract amounts, scope of projects, names, addresses and telephone numbers of references of projects. If requested, he shall also submit evidence of sufficient financial resources for completion of the Contract. A bidder may be required to submit a properly executed Contractors Qualification Statement, AIA Document A305.

E. Only bidders meeting the preceding qualifications will be considered or approved.

1.07 ENVIRONMENTAL PROTECTION

A. It is the intent of these specifications to exclude all substances which are potentially hazardous.

B. The Food Service Equipment Contractor is to be aware of this intent and verify through his suppliers and manufacturers that all materials and products provided for this facility are free of known environmental hazardous substances including formaldehyde and asbestos related materials. No such materials shall be installed, even on a temporary basis, in any location of the project.

1.08 COORDINATION

A. The Food Service Equipment Contractor limits his use of the premises to the work indicated, so as to allow for use of the site by the General Contractor and his subcontractors.

B. Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

C. Keep driveways and roadways and entrances serving the premises clear at all time. Do not use these areas for parking or storage of materials.

D. Do not unreasonably encumber the site with materials or equipment.

E. Lock automotive type vehicles, such as passenger cars and trucks, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles unattended with the motor running or the ignition key in place.

1.09 SUBMITTALS

A. Within 45 days after Contract is awarded or Letter of Intent is issued, the Food Service Equipment Contractor furnishes one set of reproducible transparencies including dimensioned rough-in drawings, equipment layout, sections, cross-sections and details for review by the Architect, his Engineers and Food Service Consultant. Within 45 days after Contract is awarded or Letter of Intent is issued, the Food Service Equipment Contractor also furnishes six (6) complete submittal booklets and one set of reproducible transparencies of all manufacturers' shop drawings for stainless steel fabrication, serving lines, walk-in cooler/freezer and refrigeration equipment for review by the Architect, his Engineers and Food Service Consultant. See requirements outlined below. Failure to submit required submittal documents and information within the stated time frame may result in retaining of funds payable for the project. The six (6) submittal booklets and one set of reproducible transparencies are submitted directly to the Architect unless General Contractor/Construction Manager requests that they be submitted through him. Include all new, existing and future equipment. After the Architect's, Engineers' and Food Service Consultant's review, the stamped reproducible transparencies and four submittal booklets will be returned to the Food Service

Equipment Contractor. The Food Service Equipment Contractor is responsible for copying all transparencies and inserting them into the four submittal booklets. Complete sets (4) will be distributed by the Food Service Equipment Contractor as follows: Food Service Equipment Contractor - One; General Contractor - One; Mechanical Contractor - One; Electrical Contractor - One. Only submittals that have been reviewed and stamped approved are to be distributed to the field for the use of other Contractors. A copy of the transfer transmittal letter is to be sent to the Architect and Food Service Consultant. It is the responsibility of the Food Service Equipment Contractor to furnish, mark-up and maintain one complete set of submittals including all dimensioned drawings as outlined in this section as a "Record Document" to be submitted to the Architect as a requirement for final acceptance.

B. Submittal booklets (6) contain the following:
   1. Specification sheets marked as specified on all buy-out and standard equipment including illustrations, line drawings, rough-in information, service connections, power/fuel requirements, water and drainage requirements, options and accessories specified and similar information. Specification sheets to be 2-sided copies printed on recycled paper.

C. Reproducible transparencies (1 set) are required for the following:
   1. All custom fabricated equipment including walk-in cooler/freezers, stainless steel fabrication and refrigeration equipment, dimensioned and drawn at a minimum scale of 3/4" to the foot, with necessary cross sections at a minimum scale of 1½" to the foot, showing complete detail for each item of specially fabricated equipment. Indicate name of manufacturer.
   2. Separate mechanical and electrical rough-in dimensioned drawings showing rough-in and final connections for each piece of equipment with each connection shown giving size, height and an explanation with each connection cross-referenced to the specification sheets or shop drawings. Note which dimensions are based on field measurements. Rough-in drawings are drawn at a minimum scale of ¼" to the foot. Above finished floor dimensions are required. All connections in the walls are located so as not to interfere with cove base of the floor tile. All electrical connections are to be water tight or located at a height to prevent water from entering. Coordinate height of rough-ins so as not to interfere with the sealing of tables, overshelves and sinks to the walls, etc., as well as at heights for the convenience of the operator. Verify heights required and coordinate with the Electrical Contractor.
   3. Service connections located under the exhaust hood must be located to provide the capture space as shown on the enlarged kitchen plan. Space between the backs of the equipment or between the backs of the equipment and wall must be maintained as shown when locating the service connection under the hood.
   4. All convenience outlets and convenience drains are included on the electrical and mechanical rough-in dimensioned drawings.
   5. Dedicated electrical service for a computer may be required in the manager's office. See electrical drawings for numbers and locations.
   6. Exposed conduit, surface mounted disconnects, surface mounted panel

boxes and surface mounted equipment control panels are not permitted unless indicated otherwise or with the permission of the Architect.

7. Provide dimensioned details, sections or elevations for all wall openings for equipment such as pass-thrus, dish machine, chutes, etc.; for all wall or floor recesses for equipment such as walk-in cooler/freezer, floor troughs, wash down system junction box and remote stations, waste system control panels, etc. All cross sections, elevations and details are drawn at a minimum scale of 1½" to the foot.
8. Provide dimensioned food service equipment layout separate from the dimensioned electrical and mechanical rough-in drawings showing the placement of all equipment, including the ventilation hood. An itemized equipment schedule is to be included.
9. Provide an electrical and mechanical schedule identified by Item number and description showing the exact electrical and mechanical characteristics required for each item including comments concerning final connections and interconnections in a check list format. Power/fuel requirements, water/drainage requirements and similar information are to be included.
10. All drawings are based upon the food service equipment layout and itemized specifications. Drawings will include accurately dimensioned layouts and locations for all masonry bases, if required or called for, and will include accurately dimensioned details and locations of any special wall openings that are required for equipment extending through walls.
11. All rough-in connections located in walls are dimensioned to avoid cove tile or stainless steel bases, shelves, table and counter tops and backsplashes.

D. All contractors are instructed to follow the Food Service Equipment Contractor's submittals. Discrepancies between the bidding documents and required connections and/or installation requirements must be brought to the attention of the Architect for his/her decision which is final.

1.10 MEASUREMENTS

A. The Food Service Equipment Contractor verifies all measurements (including shelving and aisle dimensions) at the job site and is responsible for same before proceeding with the manufacture of the equipment. He checks all measurements at job site including all areas which might affect the fitting of Food Service Equipment, installation, or other functional aspects of the equipment. He submits drawings with submittals which show structural measurements and dimensions which are critical to the proper execution and fitting of his work. Measurements shown on drawings accompanying these specifications are approximate and are for estimating purposes only. He confers with General, Tile, Electrical, Plumbing and Mechanical Contractors to coordinate and establish finished dimensions. Food Service Equipment Contractor verifies the location of all rough-in connections with other contractors before the pad is poured. Contractors other than Food Service Equipment Contractor are responsible for maintaining these dimensions in erection of their work, and will assume cost of any changes necessary due to errors in their work. Food Service Equipment Contractor is responsible for any errors provided to other contractors concerning dimensions. At time of checking measurements, Food Service Equipment Contractor carefully examines spaces and conditions, and reports to Architect any work performed by

others or planned by others which prevents him from the execution of his work as required under the Contract and obtains the Architect's final decision and instructions before proceeding.

B. No changes of building dimensions or conditions affecting equipment installation shall be made by any contractor after detailed drawings of food services equipment have been approved and measurements checked by Food Service Equipment Contractor. If such changes are necessary, the General Contractor must notify Food Service Equipment Contractor, who will immediately advise of additional cost, if any, for making required changes in equipment. Food Service Equipment Contractor shall await final acceptance or approval from Architect before proceeding with that portion of the work.

1.11 REVIEW OF SUBMITTALS

A. Review and approval by Architect, his Engineers and Food Service Consultant shall not be construed as a complete check but only that the design intent is met. Review shall not relieve Food Service Equipment Contractor from responsibility for errors which may exist and were not noted or from meeting the intent, implied or stated, of the Bidding and Contract Documents. All inspections are based on the Bid Documents.

B. Food Service Equipment Contractor is responsible for making all notations, corrections and additions to shop drawings and on orders for buy out equipment for manufacturers to ensure that the specifications are met.

1.12 COORDINATION OF SUBMITTALS

A. Coordinate preparation of submittals so that work will not be delayed by submittals.

B. Provide permanent marking on each submittal to identify project, date, contractor, submittal name and similar information to distinguish it from other submittals. Provide space for Architect's, his Engineers' and Consultant's "Action" marking. Package each submittal appropriately for transmittal and handling. Organize and assemble submittal booklets into individual loose-leaf, press-board binders made out of 50% recycled material. Vinyl 3-ring binders are not acceptable.

1.13 ADDITIONAL SUBMITTAL REQUIREMENTS

A. Additional requirements are found in overall General Requirements of the Contract Documents.

1.14 MATERIAL AND WORKMANSHIP

A. Unless otherwise specified or shown on drawings, all material is to be new, of best quality, perfect and without flaws, and delivered upon completion in an undamaged condition.

B. All workmanship is required to be the best of its respective kind. All labor to be performed in a thorough workmanlike manner by qualified, efficient and skilled mechanics.

C. Equipment will be inspected after delivery and any equipment found not to be in accordance with specifications, drawings and/or approved shop drawings will be rejected and replaced with the approved equipment at the expense of the Food Service Equipment Contractor. Any defects found during inspection must be remedied to the satisfaction of the Owner and Architect.

1.15 STANDARDS

A. Applicable standards of the Food Service Equipment Industry have the same force and effect and are made a part of the contract documents as if copied directly or as if published copies were bound herein. Comply with standard in effect as of date of contract documents.

B. Referenced standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work.

C. All equipment shall be constructed in strict compliance with the standards of the National Sanitation Foundation and in full compliance with the Public Health Regulations of the State in which installation is made. Each piece of equipment must bear "Seal of Approval" label of the National Sanitation Foundation, if applicable.

D. Dish machines must conform to Standard No. 3, and electrical and gas cooking and warming equipment must conform to Standard No. 4, or latest revisions as established by the National Sanitation Foundation, Ann Arbor, Michigan.

E. ANSI Standards: Comply with applicable ANSI standards for electric powered and gas burning appliances, for piping to compressed gas cylinders, and for plumbing fittings including vacuum breakers and air gaps to prevent siphonage in water piping (including ANSI C33.103, ANSI C33.96, ANSI/UL 471, ANSI/UL 923, ANSI/AHAM FM-1, ANSI/UL 621, ANSI C33.118, ANSI 33.59; ANSI Z21-series, ANSI Z83-series; ANSI B57.1; and ANSI A112-series, respectively).

F. NFPA Codes: Comply with NFPA No. 70 "National Electrical Code", and NFPA No. 96 "Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment', and NFPA No. 54 "National Fuel Gas Code".

G. ASME Boiler Code: Construct steam generating and closed steam heated equipment to comply with ASME Boiler and Pressure Vessel Code; Section IV for units not exceeding 15 psig or 250 [illegible] for higher pressure/temperature rated units.

H. All electrical equipment is U.L. Approved and Listed.

I. All gas equipment is AGA Approved and Listed.

J. All equipment must meet all safety standards and regulations.

1.16 MANUFACTURER'S NAME AND SUBSTITUTIONS

A. Only a Food Service Equipment Contractor (bidder) and not manufacturer's representatives or salesman may request a substitution. If a substitution is approved, an addendum will be sent out to all bidders who have requested a set of bidding documents from the Architect.

B. A request for approval of a substitution must be accompanied by the name of the manufacturer and model; a complete description of the proposed substitution, including drawings, catalog cuts, specifications, performance and test data, energy and utility usage, samples if applicable; and all other information necessary for an evaluation. A statement setting forth any changes in any materials, equipment, or work that incorporation of the substitute would require must be included. A detailed description of the manner in which the proposed substitution conforms and/or varies from the item specified must also be provided.

C. Related equipment, such as dishwasher assembly, shall be by one and only one manufacturer.

D. The burden of proof of the merit of any proposed substitute is upon the company submitting the substitute. The decision of approval or disapproval by the Owner and Architect is final.

E. If approved substitutions require changes in other materials, equipment, or work including HVAC, Mechanical and Electrical requirements, materials and connections, such required changes are made without additional cost to the Owner but at the cost of the successful bidder, Food Service Equipment Contractor, if the approved substitution is supplied. All Architectural, Engineering and Food Service Consulting costs incurred by an approved substitution, if supplied, will be paid by the Food Service Equipment Contractor.

F. By making request for substitution based on the provision herein before set forth in this Section as well as in the AIA General Conditions, Supplementary Conditions and Architectural Specifications, the Food Service Contractor represents that he has personally investigated the proposed substitute; that he will provide the same warranty as for that specified; waives all claims for additional costs related to the substitute which may subsequently become apparent; and will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be complete in all respects.

G. No request for substitution will be considered after official bid opening date and time except in instances where the item is no longer available.

1.17 COMPLIANCE WITH LAWS AND CODE REGULATIONS

A. Nothing in the Contract Documents shall be construed to conflict with any local, state or federal laws or regulations governing the installation or any part of the

work to be performed under this Contract, and all requirements shall be in accordance therewith, without any additional cost to the Owner.

B. All work and materials shall be in full accordance with the latest rules of the U.S. Public Health Service; State Public Health Service; National Board of Fire Underwriters; any local, Federal, and State Ordinances and regulations of the State Fire Marshall.

1.18 INSPECTION OF WORK

A. The Owner, Architect, or their duly authorized representative shall have free access to the work covered by these specifications for the purpose of inspection, in the shop, in storage and at the building to see that plans, specifications, and detailed drawings are being adhered to. Food Service Equipment Contractor shall correct any errors found.

B. Material delivered to site may be inspected by Architect, Owner or their authorized representative. The Food Service Equipment Contractor will, within a reasonable time after receiving written notice from Architect and/or Owner to that effect, proceed to remove from grounds or building, all materials, fixtures or apparatus condemned by Owner, or take down and remove all portions of work which Architect and Owner deems as failing to conform to drawings and specifications and to conditions of the contract.

C. The Owner or his duly authorized representative has the right to order work wholly or partially stopped until objectionable work, materials, fixtures or apparatus are removed, or to declare contract forfeited for non-performance or not being executed according to intent or meaning of drawings and specifications.

1.19 WORK BY OTHER CONTRACTORS

A. All plumbing, electrical, ventilation, and tile work required in connection with this equipment is provided and installed by contractors other than Food Service Equipment Contractor unless specifically called for in the Food Service Equipment Itemized Specifications. The work done by these other contractors includes roughing-in to points indicated on the mechanical, plumbing and electrical plans, final connections from rough-in point to various pieces of equipment requiring such connections, final connection between various pieces of equipment or within pieces of equipment as required, and the supplying of all necessary materials, tools and labor for this work except as hereafter noted. All contractors are cautioned that the rough-in locations under the hood must be located in the space shown on the enlarged kitchen drawing between the backs of the equipment or between the backs of the equipment and wall if hood is wall mounted. Tile bases, if supplied below various items of kitchen equipment, are provided by the Tile Contractor. Tile Contractor may be required to provide and install a tile or epoxy cove base along walls of walk-in refrigeration boxes as a barrier to water, dirt and vermin. Cove base is sealed by Tile Contractor to wall of walk-in box with sealant that withstands 400º F. and is formulated to seal masonry to metal. See Itemized Equipment Specifications for walk-ins for specifics. All electrical connections are water tight or located at a height to

prevent water from entering. All rough-in connections in the walls must be located to avoid cove tile bases.

B. Refrigeration work done by Food Service Equipment Contractor is listed in the Itemized Specifications except for electrical and plumbing connections to compressors, blower coils, controls, lights, etc. These final connections are made by contractors other than the Food Service Equipment Contractor. Work by contractors other than the Food Service Equipment Contractor includes interior wiring and/or control wiring in walk-in cooling equipment, wiring for lights in walk-in cooler/freezer unit, and extensions from fixtures to floor drains and floor sinks for walk-in refrigeration, ice machines, cook/chill refrigeration and sink heaters. Wiring for lights in walk-in refrigeration equipment is run through conduit installed on the ceiling inside the boxes and not on the top of the boxes. Electrical Contractor to use conduit seal-offs. See Installation Instructions, this Section for description of fasteners and use of mastic. All penetrations are insulated and sealed properly to prevent condensation on inside of boxes. Food Service Equipment Contractor is responsible for insulating and sealing all penetrations.

C. All lines and disconnect switches, safety cut-outs, control panels, fuse boxes, or other electrical controls, fittings, and connections are furnished and installed by Electrical Contractor. Starting switches are provided by Food Service Equipment Contractor. Those starting switches furnished loose as standardized by Food Service Equipment Manufacturers (other than fabricated items) are mounted and wired completely under the Electrical Contract.

D. Any sleeves or conduit required for alarm systems, refrigeration and tubing lines are furnished and installed under the Mechanical Contract unless indicated otherwise in Food Service Equipment itemized Specifications this Section.

E. Plumbing Contractor shall flush all lines free of foreign matter before connecting fixtures.

F. The Electrical Contractor supplies and installs all conduit and wiring for rough-in, final and inter-connections and makes all final connections within, between, and to equipment. It is the responsibility of the Electrical Contractor to check all items to see where starters, contactors, switches, etc., are required and supply accordingly. Cord and plugs provided loose by the Food Service Equipment Contractor are installed by the Electrical Contractor. All electrical connections are water tight or located at a height to prevent water from entering. Verify heights required. Coordinate height of rough-ins so as not to interfere with the sealing of tables, sinks to the walls or movement of mobile equipment, particularly portable serving lines, etc. Exposed conduit, surface mounted disconnects, panel boxes, control panels, etc. are not permitted unless indicated otherwise or specifically called for by the Architect.

G. The Plumbing Contractor shall rough-in and make all final connections including all materials and labor for water and waste within, between and to the items which will be furnished and set-in-place by the Food Service Equipment Contractor. The Food Service Equipment Contractor furnishes faucets, all lever waste drains,

hose reels with mixing valves to the Plumbing Contractor for connection and installation. The Plumbing Contractor provides water supply piping, traps, check valves, water pressure reducing valves, vacuum breakers, tail pieces and fittings, waste piping, floor drains, shut-off valves, and all other necessary fittings. Back flow prevention devices supplied by the Food Service Equipment Contractor for installation by the Plumbing Contractor are identified in the Itemized Specifications of Section 11400. All other back flow prevention devices required by regulatory codes and/or the Public Health Department are supplied and installed by the Plumbing Contractor. The Plumbing Contractor will supply half drain covers on floor drains or floor sinks for free flowing drain connections where required to prevent water from splashing on surrounding floor and/or equipment.

H. Drain and trough covers/grates cannot be higher than the surrounding plane of the floor and must be at the finished floor line.

I. Tile Contractor is required to furnish and install a water proof barrier at thresholds between quarry tile or hard surfaced floors and soft tile floors if a wash down system utilizing 190º F. water is specified. Tile Contractor may be required to install a quarry tile base along the front of the walk-ins unless indicated otherwise in the Itemized Specifications this section. The quarry tile base is applied to the metal surface of the walk-in wall with adhesive manufactured for gluing masonry to metal. After adhesive has set, grout is applied. As finishing, clear silicon caulking manufactured for sealing metal to masonry and to withstand 400º F. temperature is installed at the seam at the top of the cove tile base by the Tile Contractor.

J. The Mechanical Contractor furnishes and installs all ventilation equipment required for food service equipment. He furnishes and installs all exhaust fans, ventilation ducts and transitions, and connects to equipment. Exhaust fans must be of sufficient capacity to operate equipment. Mechanical Contractor is responsible for cleaning exhaust hood and providing training to Owner in the use, care and maintenance of the hood and fire suppression system. Mechanical work done by the Food Service Equipment Contractor is listed in the Itemized Specifications. Ventilator dimensions shown on the Enlarged Food Service Equipment drawing are capture area dimensions only.

K. The General Contractor is responsible for providing a finished floor that is level unless noted otherwise on the Plumbing Drawings or in the Contract Documents. Drain and trough covers/grates cannot be higher than the surrounding plane of the floor and must be at the finished floor line.

L. The General Contractor furnishes openings and passage ways of sufficient strength to sustain the weight of the equipment. He furnishes openings and passage ways of sufficient size to permit the delivery and erection of the equipment in their respective locations without dismantling, providing the sizes are the same as shown on the shop drawings. The General Contractor furnishes depressed floor for drain troughs and insulated floor for walk-in cooler/freezer. When walk-in refrigeration boxes are recessed, the General Contractor provides a recess to the depth indicated by the Food Service Equipment Contractor that is transit level and trowel smooth.

M. General Contractor provides all openings and penetrations in walls, ceilings, roofs, etc., for the food service equipment as required and finishes such openings as specified in the Contract Documents or in the Itemized Specifications this section. Penetrations include openings for equipment, ducts, conduits, refrigeration lines, etc., as well as wall recesses for control panels, disconnects, etc., and are made in accordance with all local and state codes. Through the wall chutes are grouted into place by the General Contractor unless built into a wall during construction as indicated in the Itemized Specifications this Section. Masonry block must be straight edge, not coved, at openings for refrigerated and heated pass-thrus, openings at soiled dish return and tray pass-thru in order for trim to fit properly.

N. Equipment is not delivered, removed from crates, set-in-place for final connections until as a minimum all painting has been completed; ceilings, hood and ventilation duct work are in place; floor is acid cleaned; and all rough-in connections are in place. Site must be ready for final connections. Before final cleaning of equipment by the Food Service Equipment Contractor, work by all other trades and the General Contractor must be completed including cleaning of tile floor and hood to a condition ready for use.

O. General Contractor shall confer with the Food Service Equipment Contractor on all measurements, location and measurement of recesses and openings, verification of all connection requirements, etc.; coordinate scheduling and transfer of all information including measurements, drawings, etc., provided by the Food Service Equipment Contractor with all other trades; schedule meetings as required between Food Service Equipment Contractor and other contractors: provide Food Service Equipment Contractor with construction schedules and coordinate scheduled dates of installation based on requirements outlined in this Section. See Installation Requirements, this section, for specifics.

P. General Contractor shall notify Food Service Equipment Contractor of the dates and times of all construction meetings. Food Service Equipment Contractor is required to attend all construction meetings.

Q. All Contractors are to be instructed that the submittals prepared and provided by the Food Service Equipment Contractor are to be used for construction and installation. Any discrepancies between the bidding documents and Food Service Equipment submittals are to be brought to the attention of the Architect. The Architect's decision is final.

1.20 WAREHOUSING

A. Because of the possibility of damage to the kitchen equipment, it is not shipped directly to the job site. It is shipped to the Food Service Equipment Contractor's warehouse and delivered and removed from crates by him. The one exception to this is fabricated equipment, which may be shipped at a time when the building is ready to receive it and which may be delivered directly to the job site. The delivery time is coordinated with the General Contractor to arrive at a time when it will not interfere with the operation of other contractors, but in time for the

various tradesmen to make their final connections.

B. Stored materials must be stored in an insured warehouse by the Food Service Equipment Contractor. The Food Service Equipment Contractor is totally responsible for stored equipment.

C. Receipt, unloading, removal from crates, etc., is the sole responsibility of the Food Service Equipment Contractor.

1.21 ROYALTIES AND PATENTS

A. Food Service Equipment Contractor pays all fees and royalties for patented articles used under this specification.

1.22 SPECIFICATIONS FOR FABRICATED EQUIPMENT

A. It is the purpose of these requirements to purchase for the owner, special fabricated items that conform to the best existing policies of the industry. These items have been selected as preferred items as a result of past experience in functional design, construction, material, and in maintenance and repair.

B. The material used in manufacturing equipment shall be as hereafter specified. Material that is not definitely specified shall be of the best quality used for its specified or intended purposes. All materials shall be new and free from all defects and imperfections. All fabricated equipment in this specification shall be custom built by a fabricator who has a complete factory with suitable equipment, personnel, and engineering facilities to properly design, detail, and manufacture the highest quality of food service equipment. All fabricated equipment shall conform to the current standards of the National Sanitation Foundation (NSF), Ann Arbor, Michigan. All fabricated equipment shall bear the NSF seal applied before delivery to the job site.

C. Where not defined in Itemized Specifications, all General Specifications and Sections take precedent.

D. Deviations or changes from the General Specifications for Fabricated Equipment are found in Itemized Specifications.

E. Where units cannot be fully shop fabricated; fabrication shop shall complete fabrication work at project site.

F. Food Service Equipment Contractor is required to make all field measurements and dimensions and deliver and install all fabricated equipment. Measurements are made wall to wall. Fabricator to allow ¼" for fit.

G. Electrical Specifications
   1. Motors up to and including ½ H.P. are wired to 110, 115, or 120 volts, single phase. Motors over ½ H.P. are wired for 208 or 220 volts, three phase, unless otherwise noted on Architect's plans or in the Itemized Specifications.

2. Heating elements having a connected load up to and including 1,000 watts are wired for 110 or 220 volts, single phase. Any heating element over 1,000 watts or any combination of heating elements within one fixture totaling more than 1,000 watts is wired for 208 or 220 volts, single phase, unless otherwise noted on Architect's plans or in the Itemized Specifications. All units are wired to a single master switch.
3. Provide 480 volt, three phase power where called for in the Itemized Specifications or as noted on Electrical drawings.

H. Switches and Controls
1. The Food Service Equipment Contractor supplies for each motor driven appliance or electrically heated unit, a suitable control switch or starter of proper type in accordance with Underwriter's Code. Controls that are mounted on vertical surfaces of fabricated fixtures are set into recessed die stamped stainless steel cups or otherwise indented to prevent damage.
2. All internal wiring for fabricated equipment items, including all electrical devices, wiring controls, switches, etc., built into or forming an integral part of these items are furnished and installed by Food Service Equipment Fabricator in his factory with all items wired completely to a junction box within the fixture ready for final connection to building lines. All receptacles are grounding type listed by Underwriters Laboratories and approved by National Electrical Code. A standard three-prong plug to fit "U" slot grounding type receptacles is provided for all equipment operating off a 110 or 120 volt single phase A.C. electrical outlet. A three-wire cord of suitable length is provided for this equipment as well. All cord sets are to contain an equipment grounding conductor and be furnished with caps or plugs listed by Underwriter's Laboratories.

I. Faucets, Valves and Fittings
1. Food Service Equipment Contractor furnishes all faucets and lever waste drains. Sinks are fitted with faucets as called for under each item or as separate item listed as faucets. All special faucets for kettles, pre-wash, etc., are listed under Itemized Specifications.
2. Faucets are properly tagged with item numbers and delivered to Plumbing Contractor on job for installation. Mounting of faucets to fixtures is responsibility of Plumbing Contractor. Lever waste drains are installed into bottom of sinks by Food Service Equipment Contractor.
3. Special faucets/spray assemblies consisting of individual components shall be preassembled by Food Service Equipment Contractor prior to being delivered to Plumbing Contractor for installation.

4. T & S Brass and Bronze Works, Inc. faucets and hose and spray units with a mixing valve are equipped with Eterna Cartridge designed with internal spring checks to prevent cross flow of water. If mixing faucet is attached to hose and spray unit with back flow prevention device, the faucet may have to be modified with a spring check spindle and/or check valves provided to prevent cross flow of water. Back flow prevention devices must be compatible with base unit and meet Public Health Code. It is the responsibility of the Food Service Equipment Contractor to verify the Public

Health requirements and supply back flow prevention devices accordingly.

5. All other fittings, such as stops, shut-offs, trap valves, etc., furnished and installed by Plumbing Contractor.
6. Openings for faucets and spray units are located by the Fabricator to prevent handles from hitting splash when in the fully open position.

J. Non-Corrodible Alloy

1. Non-Corrodible alloy, or stainless steel, specified hereafter is Type 304 stainless steel, having a standard analysis of 18% chrome and 8% nickel and .08% carbon steel.
2. All gauges, where specified, are United States Standard gauges. All exposed surfaces are given a #4 finish 180 grit. Where manufacturing process and welding disturb the original finish, it is carefully reground, polished and restored to match balance of surface. All gauges not specified are United States Type 304, 18-8, 14 gauge stainless steel.

K. Galvanized

1. Where galvanized iron is specified, tight coat galvanized Copper Bearing is furnished in largest possible sheets with as few joints as necessary. The sheets are of an approved grade, re-rolled for smoothness.
2. Paint with hammertone grey enamel which meets U.S.D.A. criteria unless specified otherwise. Underbracing is not painted.

L. Welding

1. All welding of stainless steel, whether specified or implied, is accomplished by the heli-arc method using stainless steel rod of the same composition as the parts welded. Welds are ground smooth and polished to the original finish of the metal, with the grain uniform to the grain of the original sheet. The stainless steel welds are free of pits, flaws, discolorations, and peened to remove flux and impurities. Where the grinding and polishing have destroyed the grain, restore and blend to obliterate all traces of welding. Welds are ground back to the surface of the original metal and sealed. Acetylene welding will not be accepted. Solder will not be accepted. Shop seams and corners in stainless steel tops shall be welded, ground smooth and polished.
2. All welds of galvanized metal on dish tables and sinks shall be ground smooth and sandblasted and sprayed with molten zinc at 1200º Fahrenheit to a .004 thickness. Tinning of welds is not acceptable.

M. Pipe Stands and Frames

1. All pipe stands for work tables, open base tables, dish tables, sinks and drainboards are constructed of 1-5/8" O.D. stainless steel tubing (16 gauge, type 304) or as indicated in the Itemized Specifications. All stringers and cross bracing are of same material as legs. All joints between legs and cross braces are notched, welded and ground smoothly. Legs fitted at top with fully enclosed stainless steel gussets welded to angle underbracing and stud bolted to top. Legs are attached without the use of bolts and are spaced on maximum of 4' to 5' centers.
2. Crossrails are supplied between each leg. Legs anchored to closed gussets at top only and without crossrails are not acceptable. Constructed

of 1-5/8" O.D. stainless steel tubing (16 gauge, type 304).

3. All crossrails are 12" O. A. above floor, or as called for by local health authorities. Verify that height of crossrails does not interfere with service connections.

N. Bracing

1. Bracing is 12 gauge 1" x 4" x 1" galvanized iron channels and 12 gauge 1½" x 1½" x 1/8" galvanized iron angles. See Table Top section for attachment. Amount of bracing provided is as required to reinforce to prevent noticeable deflection. Tops of work tables, dish tables, undershelves, enclosed base tables, serving counters and drainboards are braced. Clear silicon caulking manufactured to withstand 400ºF. is applied at seam between bracing and tops.
2. Exposed underbracing is 14 gauge, type 304 stainless steel.

O. Sound Deadening

1. Furnish sound deadening pads to break metal to metal contact between bracing and tops on all work tables, dish tables, sinks, drainboards, enclosed base tables and serving counters except where noted otherwise.
2. Furnish sound deadening pads on underside of all sinks including pre-wash and disposal sinks, dish tables, drainboards, and underside of all tables between bracing.
3. Double walled sliding and swing doors are fitted with sound deadening insulation between the walls.

P. Feet

1. All pipe legs are fitted with sanitary die stamped stainless steel bullet shaped feet, fully enclosed with a slightly rounded bottom to protect the floor. Top of these feet are fitted with a male threaded stem to fit into the end of pipe legs hereinabove specified and provide a total adjustment of 1". Stem is extra long so threads are not exposed. Bottom of pipe leg is finished off smoothly and overlap stem to provide sanitary fitting and prevent accumulation of grease or other debris at this joint.
2. Cabinet type fixtures are mounted on 6" high die stamped sanitary one piece stainless steel legs and adjustable feet not less than 3" in diameter at top. Bottom adjusting member to telescope up into inside of upper member and match adjuster on open base units. Legs are fitted with a male threaded stem and have an adjustment of 1" on the 6" high legs. The upper part is stamped in a neat design with flared inverted shoulder, welded to stainless steel base plate designed for anchoring to channel braces below cabinet type fixtures.

Q. Table Tops (Metal)

1. Metal table tops are made of 14 gauge stainless steel. See Itemized Specifications for description of edge. Shop seams and corners are welded, ground smooth and polished. Working tops are reinforced on the underside with a framework of 12 gauge 1" x 4" x 1" galvanized iron channel and 1½" x 1½" x 1/8" galvanized iron angles as required. All horizontal and vertical cove corners are on a ¼" or larger radius. Height of table top is 34"

AFF.

2. Tops are reinforced so there will be no noticeable deflections, with reinforcements stud welded to underside of top. Rivets or bolts used through the top are not accepted. Reinforced with 12 gauge 1" x 4" x 1" galvanized iron channel and 1½ " x 1½" x 1/8" galvanized iron angles. Bracing is stud bolted to underside of top with cadmium plated lock nuts. Sound deadening pads are applied to break metal to metal contact between all bracing and underside of top.
3. Field joints are provided in tops where necessary, located for practical construction and consistent with sizes convenient for shipping and accessibility into buildings. See section entitled "Field Joints" for description of these joints.
4. See Itemized Specifications for description of edge.

R. Dish Table Tops

1. Tops of dish tables are constructed of 14 gauge stainless steel with all free edges turned up 3" and finished with 1½" diameter sanitary rolled rim. Sides and back adjacent to walls or higher fixtures are coved up 8", returned 2" on a 45º angle, turned straight back 1/2" and straight down ½" along wall edges to an overall height of 10". Table is attached to wall with 12" stainless steel strips (Z clips). All interior horizontal and vertical corners are coved on a ¼" or larger radius. Outside radius of rolled rim corners is concentric with inside cove. Top is reinforced, braced and sound deadened same as Table Tops.
2. Dish Table Tops are mounted on tubular stainless steel legs and adjustable feet with connecting rails the same as specified for pipe stands and frames.
3. Ends of splash are closed. Free corners of tops are spherical.
4. Legs are fitted with adjustable stainless steel bullet feet as described under "Feet".
5. Field joints are provided in tops where necessary, located for practical construction and consistent with sizes convenient for shipping and accessibility into buildings. See section entitled "Field Joints" for description.

S. Drawers

1. Drawer housing is fully enclosed and is made entirely from 18 gauge 304 stainless steel including any reinforcements, 24" x 24" x 8", or as called for in Itemized Specifications.
2. Internal drawer slide assembly is removable. Drawer slide assembly is stainless steel full extension drawer slides with stainless steel bearing wheels and screws: Standard-Keil 1452 series or Component Hardware Group Inc. S52 series.
3. Drawer face is of 14 gauge stainless steel. Face is equipped with an integral handle across the entire top of the drawer.
4. Drawer pan is die drawn with fully coved corners from one piece of 18 gauge 304 stainless steel, 20" x 20" x 5" deep or as called for in the Itemized Specifications. Top edges to flange out 1½". Interior horizontal corners of the pan are rounded on a 1" radius and interior vertical corners of the pan on a 2" radius. The use of solder or other material to fill in these corners is not acceptable.

5. Apply 1/8" mastic sealant between drawer flange and work surface.
6. Tier of drawers is constructed in same manner as single drawer.
7. Drawers over 5" deep provided with drain hole and cap in front.
8. Each drawer mounted on a mobile unit contains (2) concealed magnetic latches with a minimum release tension of twenty pounds located at rear of drawer.
9. Single drawer and top drawer in tier of drawers are fabricated with a trough protector (gutter) to prevent entry of moisture.

T. Undershelves
1. The undershelves on open base tables are solid stationary type of 18 gauge stainless steel. All edges have a 1½" flat turndown edge unless otherwise noted in the Itemized Specifications.
2. Provide bracing full length of undershelf.
3. Shelves are notched and welded to legs of table.

U. Elevated Shelves
1. Elevated shelves are constructed of 16 gauge stainless steel.
2. Shelf is mounted on 16 gauge 1-5/8" O.D. stainless steel tubular supports. Shelf is 12" wide; height is 18" and shelf is supported by cantilever supports mounted through the splash and into gusset welded to table bracing. Gusset fitted with set screw.
3. Three supports are required for shelves four to eight feet in length. One additional support is required for each additional three feet over eight feet in length as a minimum.
4. Front and sides have a marine edge. Back side is turned up straight 2".
5. A minimum of ½" of insulation is required to separate heat lamps and shelf when lamp is installed underneath shelf.

V. Wall Mounted Shelves
1. Wall mounted shelves are constructed in same manner as Elevated Shelves. Front and sides have a marine edge. The rear is turned up straight 2". Corners to be rounded, welded and polished. Shelf to be sealed with clear silicon caulking.
2. Shelf to be stud welded to 14 gauge stainless steel bracket. One additional bracket is required for each additional three feet over four feet in length as a minimum.

W. Sinks
1. Sinks are of the size called for, constructed of 14 gauge stainless steel, type 304 (18-8), #4 finish. Backs, bottoms and fronts shall be formed of one continuous sheet with ends welded in place. Compartment sinks have double wall partitions of same material as sink.
2. Vertical and horizontal corners, including partition, are coved ½" or larger radius, electrically welded, ground smooth and polished.
3. Top edges of sinks at front and ends, except where fitted with integral type drainboards, are furnished with a 1½" die formed integral sanitary roll rim.
4. Across back of sinks, unless otherwise specified, there will be a 10" high backsplash at walls. When sink adjoins side walls, unless otherwise

specified, there will be a 10" high sidesplash. Back and sides, where applicable, are coved up 8", returned 2" on a 45º angle, turned straight back ½"" and straight down ½" along wall edges to an overall height of 10". Sink attached to wall with 12" stainless steel strip (Z clips). Faucet holes are provided in backsplash 4" down from top. Faucet holes are centered over single compartment sinks and centered over partitions on multi-compartment sinks. Where roll terminates into backsplash the roll is fully welded and polished thereto. Ends of splash are fully enclosed, integrally welded, finished and polished and fully sealed by welding to meet NSF requirements unless specified otherwise. Sinks not adjacent to wall are equipped with backsplash that is fully enclosed, integrally welded, finished and polished and fully sealed by welding. Access openings are provided by the fabricator in the top and bottom of the enclosed backsplash for piping for faucets and vacuum breakers. Rubber grommets are supplied to seal between the piping and the edge of the openings to prevent corrosion between dissimilar metals.

5. Sinks are 37" high to top of roll, 34" AFF to deck and 14" deep from top of roll to bottom of compartment unless specified otherwise.
6. Bottom of each compartment is die-stamped with tapered grooves at least ¼" deep at drain depression. Each compartment is provided with 2" lever type drain. Drain is fitted with rod lever for opening and closing drain. Each rod handle is suitably braced to bottom of sink with 16 gauge stainless steel bracket. All other components are nickel plated to match stainless steel. Drain is equipped with solid stainless steel handle assembly. Strainers are flat type made of stainless steel and snap-in. Drains have positive sealing action with heavy wall cast bronze body and self-centering face flanges.
7. Bodies are mounted on 1-5/8" O.D. tubing legs of 16 gauge stainless steel and fitted with stainless steel bullet type adjustable feet. Legs are mounted with 16 gauge stainless steel fully enclosed gussets fully welded to the sink bottom. See Pipe Stands and Frames and Feet sections.
8. Crossrails are 1-5/8" O.D. stainless steel tubing located 12" from floor, running front to back on legs forming a "H" frame unless specified otherwise. See Pipe Stands and Frames section. Locate crossrails to the front of the sink compartments. Coordinate height of crossrails and location of legs to avoid interference with sink heater controls.
9. All three-compartment sinks with drainboards longer than 27" to have six (6) legs unless specified otherwise. All three-compartment sinks with drainboards 27" or shorter to have four (4) legs mounted underneath sink body at corners. All drainboards longer than 27" require legs. If sink heater is specified for three-compartment sink with drainboards longer than 27", crossrail is located in front of drainboard adjacent to sink heater and rear of drainboard opposite of sink heater. If sink heater is not specified for three-compartment sink with drainboards longer than 27", crossrails are located at rear of drainboards.
10. In compartment with a sink heater, move the sink drain toward the side opposite the heater.
11. All three compartment sinks have 24" x 27" compartments with an overall width of 31¼" unless specified otherwise. Compartment size must accommodate 18" x 26" sheet pans for total immersion.
12. Overall length and width is noted in the Itemized Specifications.

13. Bracing and sound deadening are the same as for table top.
14. Sound deadening pads are furnished on underside of sink compartments and drainboards.
15. Coordinate with Plumbing Contractor for location of faucet and vacuum breaker and provide knock-outs for same.
16. Provide rubber grommets for openings through which plumbing lines are routed to prevent dissimilar metal from touching. Label and deliver to Plumbing Contractor for installation.

X. Sink Inserts
1. Sink inserts are fabricated with no visible seams, size as called for, and constructed of 14 gauge stainless steel.
2. Sinks are welded integral with counter tops with no lap between.
3. Corners, partitions, bottoms and drains, sound deadening, etc., as specified under section entitled "Sinks".

Y. Sink Drainboards
1. Drainboards are constructed of same material as sinks and welded integral to same. Drainboards to have 1½" high rims with die formed integral rolled edges to match sink edges. Horizontal and vertical corners are coved on a ¼" or larger radius, electrically welded, ground and polished to a #4 finish. Solder filling of these corners is not acceptable. Drainboards are pitched to properly drain into sink. (Minimum pitch in top of drainboards is 1/8" per foot from end of drainboard to sink compartments).
2. Across backs and ends against walls or high fixtures, drainboards have a 10" high backsplash and sidesplash, when applicable, to match splash of sink compartment. Backsplash and sidesplash, when applicable, are welded integral with splash of sink compartment with ends fully enclosed, integrally welded, finished and polished and fully sealed by welding. Attached to wall with 12" stainless steel "Z" clips. See description for exposed backsplashes and sidesplashes this Section for specifications for drainboards not attached to wall.
3. Sink and drainboards are constructed so that the rolled rims on drainboards are continuous and at the same height of 34". Where drainboards are longer than 27" in length, they are supported on pipe legs of same material as used for sink legs and cross braced above the floor with pipe rail. See Pipe Stands and Frames section.
4. Drainboard underbracing is 1½" x 1½" x 1/8" 14 gauge, type 304 stainless steel stud bolted to top. Sound deadening pads applied between angles and top and on underside between angles.

Z. Edges
1. Marine edge.
2. Bull nose marine edge.
3. Bull nose edge.
4. Flat rim edge.
5. Standard table edge.
6. Flat turndown edge.
7. Standard roll rim edge.

8. Rolled table edge.

AA. Back, Sidesplashes

1. Back and sidesplashes cove up 8", return 2" on a 45º angle, turn straight back ½" and turn straight down ½" unless enclosed to an overall height of 10". If adjacent to wall and non-mobile, attach to wall with 12" stainless steel strips (Z clips).
2. Sides of sidesplashes and ends of sidesplashes are fully enclosed, integrally welded, finished and polished and fully sealed by welding to the top to meet NSF requirements unless specified otherwise. Use of silicon cannot be used to seal sidesplash on the outside but is one continuous piece. Sidesplash adjacent to wall is coved up 8", returned 2" on a 45º angle, turned straight back ½" and turned straight down ½" to an overall height of 10" and attached to wall with 12" stainless steel strips (Z clips). End is fully enclosed, integrally welded, finished and polished and sealed by welding to the top.
3. Ends of backsplash are fully enclosed, integrally welded, finished and polished and fully sealed by welding to the top to meet NSF requirements unless specified otherwise.
4. Backsplash and sidesplashes for mobile equipment or equipment not adjacent to wall are fully enclosed, integrally welded, finished and polished and fully sealed by welding to the top and sides to meet NSF requirements unless specified otherwise. Use of silicon cannot be used to seal splashes on the outside but is one continuous piece. Access openings are required in fully enclosed backsplash by the fabricator through the top and bottom of the backsplash for equipment requiring piping for faucet and vacuum breaker. When applicable, removable 16 gauge, Type 304, 18-8 stainless steel enclosure panel (skirt) is supplied and installed at back of equipment below backsplash to cover exposed electrical and plumbing connections. Equipment attached to wall with "Z" clips does not have an enclosed backsplash but backsplash is turned down next to wall ½". End is fully enclosed, integrally welded, finished and polished and fully sealed by welding to the top.
5. All fully enclosed backsplashes and sidesplashes extend down to counter or table top or below in order to cover all underbracing.
6. In instances where backsplashes and sidesplashes are attached to the walls and are not fully enclosed, exposed underbracing is 14 gauge, type 304 stainless steel.

AB. Casters

1. All casters, unless specified otherwise, are 5" dia. Tente heavy duty locking casters. Stem casters to be Tente Model No. 2477DIK125R07; plate casters to be Tente Model No. 2477DIK125P50.

AC. Field Joints

1. Field joints are located for practical construction, consistent with sizes convenient for shipping and accessibility into building.
2. Field joints in tops are carefully sheared so they can be tightly butted and joined together to form an integral unit to match balance of equipment.
3. Field joints and butt joints are heli-arc welded, ground and polished smooth

only by an approved fabricator.

AD. Refrigeration Service
1. Refrigeration service includes start-up and all service, parts, mileage, transportation and labor for one year from the date of final acceptance by the Owner and a five year non-prorated compressor replacement warranty from the date of final acceptance by the Owner.

AE. Painting
1. All fixtures, unless made of stainless steel, are finished with hammertone grey paint of the highest quality, air-dried and applied in accordance with the manufacturer's direction.

AF. Joints, Finishes and Trim Strips
1. All equipment is formed of one piece of material wherever possible, with due regard to shipping and erection.
2. All joints, where necessary, are homogeneously welded by electric fusion metal arc, using welding rod of same composition as material being welded, ground smooth and polished to an invisible joint to match adjoining surfaces.

AG. Definition
1. "Fully" is defined as continuously. Stainless steel gussets are fully (continuously) welded.

AH. Sealing
1. Any gaps or crevices such as the seam between under bracing and top are fully (continuously) sealed with sealant as described in this Section.
2. Supply and install rubber grommets for all openings through which dissimilar metals pass such as piping for disposal vacuum breaker in soiled dish table.

AI. Coordination
1. Provide copy of specification sheet or shop drawing for integral equipment such as dish machine, waste system, disposal, booster heater, etc. to fabricator for use in preparing submittal drawings.

AJ. Approved Fabricators
1. Fabricators which are pre-approved for construction of stainless steel custom fabrication are: Atlanta Custom Fabricators, Douglasville, GA; Low Temp Manufacturing, Jonesboro, GA; Stainless Fabricators & Installation, Inc., Lexington, SC; Stainless Innovations, Fort Smith, AR.
2. Fabricators which are pre-approved for construction of stainless steel custom fabrication of specialty items such as pant-leg duct, cap openings, tray slides, trim, etc. are ShoffnerKalthoff, Inc., Knoxville, TN, Specialty Stainless, Knoxville, TN plus fabricators listed previously.

1.23 FIBERGLASS REINFORCED POLYESTER (SERVING LINE)

A. The fiberglass reinforced polyester (F.R.P.) is molded with permanent color. The F.R.P. pylon has a minimum of 5.25 ounces per square foot of fiberglass mat. Bottom, lower sides and top sides have additional 2.66 ounces per square foot of woven roving. The glass content is 30% to 38%, barcol hardness a minimum of 50%, flexural strength 27,600 P.S.I., tensile strength 17,900 P.S.I. and compressive strength 25,600 P.S.I. Fiberglass carries a ten year manufacturer's warranty. Where finished, F.R.P. parts are used in conjunction with casters or other component parts which impact concentrated stress at specific points; these points shall be internally reinforced with metal channels and other reinforcing shapes.

B. Legs: When specified, legs are 6" high stainless steel with stainless steel bullet feet adjustable to 7-3/4" high.

C. Counter height is 34" maximum.

D. Casters: When specified, casters are Tente, 5" in diameter, swivel, ball bearing casters with non-marking hard rubber tires. Brake casters are supplied when specified. NOTE: Some items may require other size casters to maintain height as specified. See section on Casters under Specifications for Fabricated Equipment.

E. Manufacturer supplies cord and plug sets for serving counters except where counters are hard-wired. Cord and plug sets are attached to units. Receptacles and boxes are provided by Electrical Contractor.

F. Upright supports for over structures are located so as not to interfere with self-service. Particular attention to be given to refrigerated or cold pan units with recessed inserts and units with heated wells.

G. Tray Slides: All tray slides are 10” wide, 16 gauge stainless steel with three (3) inverted “V” ridges. Tray slides shall be mounted on stainless steel fold-down support brackets.

H. Height of Display Cases: Height of display cases is the same on all serving units unless otherwise noted in the Itemized Specifications.

I. Heat lamps are Hatco, standard wattage, unless indicated otherwise.

J. Tops are 14 gauge, Type 304, 18-8 stainless steel.

K. Sneeze guards for display cases are straight with no turn-down. Sneeze guards are banded with no exposed edges. Sneeze guards are adjustable and can be fixed into position by means of a set screw mounted on upright. Sneeze guards are installed to allow for maximum access by customers and prevent upward movement if bottom is hit by customer’s arm.

L. All controls and on/off switches for electrical components on self-service counters

(hot food wells, heat lamps, lights, refrigerated cold pans, etc.) are mounted behind mechanical access doors (or behind access louver for ice cream cabinets). All controls to be labeled at factory.

M. Coil for milk and refrigerated salad units is located behind stainless steel access louver. Access louver does not require tools for removal. Access to coil is required for cleaning.

N. Units specified with hinged doors are provided with double access doors if length permits.

O. All hot food wells are to be provided with drains plumbed to faucet in base of unit.

P. Hot wells, cold pans, etc. are centered in tops and top mounted.

Q. Cord hanger is supplied on all mobile units for cords to be wrapped around. Units with two cord and plug sets are equipped with two cord hangers.

R. All mobile units with drains must have a drain bib that accepts a garden hose. The bottom of the drain bib is approximately 4” above the bottom of the unit. Drainage opening to be cut in the bottom of the unit under drain. Drain is easily accessible at mechanical access doors for attachment of garden hose and storage underneath unit.

S. Clearance from bottom of unit to floor is a minimum of 6”.

T. All tray slides have interlocks/leveling locks. Tool for use in locking and unlocking units is supplied. Exception: Free-standing units that do not align with other serving counters.

U. Locate cord and plug on end of unit closest to receptacle; locate drain on end of unit closest to floor drain.

V. Minimum of 1” of insulation, spacers and/or air gap are required between heat lamp and shelf above it to prevent shelf from heating. Increase insulation and/or air gap or modify construction to meet design intent.

W. Sneeze guards over self-serve hot food units or salad bars shall be constructed of curved acrylic, and flip up for loading of food. Ends shall be acrylic panels.

X. Cashier stands to be equipped with solid stainless steel shelf under unit from foot rail to back of unit for storage of napkins, etc. for replenishing during serving. Shelf to be welded into place.

Y. All refrigerated units must be equipped with forced air or tempest air, and meet NSF-7 requirements.

Z. Colors are selected by the Architect. Colors selected may be any standard color from the manufacturer’s color chart. Each unit may be a different color or colors

if decor panels are specified.

1.24 GENERAL MANUFACTURING NOTES FOR ALL EQUIPMENT

A. It is the intention of the specifications to purchase equipment to meet the individual needs of the Owner. The primary requirements in the manufacture of the equipment are the proper use of materials and construction as specified. Inaddition, features of sanitation, ready accessibility for cleaning, low cost of repair, maintenance and operation, strength and ruggedness were considered and shall be maintained in the manufacture or fabrication of this equipment.

B. It is the purpose of the specifications to provide for the Owner, items that conform to the best existing policies of the industry. The material used in manufacturing equipment shall be as specified. Material that is not definitely specified shall be of the best quality used for its specified or intended purposes. The items have been selected as preferred as a result of past experience in functional design, construction, energy efficiency and maintenance and repair.

C. It is the intention of the specifications that all exposed surfaces of equipment be free from bolts, screws, and rivet heads. Wherever bolts are required, they shall be concealed type wherever possible and are of similar composition to the metal to which they are applied.

D. Water inlets are located above positive water level to prevent siphoning of liquids into the water system. Wherever conditions require a water inlet to be placed below the water level, Food Service Equipment Contractor supplies a suitable type of vacuum breaker or back flow prevention device for the fixture to form part of same to prevent siphoning; labels and delivers to Plumbing Contractor for installation. Food Service Equipment supplier is required to furnish back flow prevention device as required by the Public Health Department for any piece of equipment supplied. It is noted that Public Health Departments usually require a back flow prevention device on the water inlet for Steamers and Convection Combo type units. All back flow prevention devices must be acceptable to the Public Health Department.

E. Food Service Equipment Contractor supplies all faucets, spray and hose units with mixing valves and cross flow prevention devices if supply through unit is hot and cold water and all hose and spray units with back flow prevention devices. See description of Faucets, Valves and Fittings this section. Parts that are not installed by F.S.E.C. are labeled and delivered to Plumbing Contractor for installation.

F. Suitable pipe slots are provided through all undershelves to accommodate necessary service lines. These slots are proper size and are neatly made with turned up edges on all four sides to eliminate cutting or defacing of equipment on job. Cabinet bases are provided with an inner panel duct at ends or rear of cabinet to allow enclosed vertical and horizontal pipe space to conceal the vertical and horizontal piping.

G. All hardware, including that used for refrigerators, is heavy-duty cast type and

designed for locking device. Mounting screws are stainless steel or non-corrosive. Hardware is selected for the particular use to which each piece is intended. Mastic is required between non-similar metals to prevent rusting.

PART 2 - PRODUCTS

NOTE! THE FOLLOWING ITEMS ARE LOCATED IN THE HIGH SCHOOL CAFE:

ITEM C-1 2-SECTION REFRIGERATED MERCHANDISER Quantity: 1

MANUFACTURER: True Food Service Equipment, Inc.

MODEL: GDM-47-LD

ELECTRICAL: 115/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Oversized, factory balanced refrigeration system maintains 33°F. to 38°F.
2. Bottom mount self-contained refrigeration system uses CFC free 134A refrigerant.
3. Low "E" double pane thermal insulated sliding glass doors.
4. White aluminum NSF approved interior liner.
5. Eight (8) adjustable, heavy duty PVC coated shelves.
6. LED interior lighting.
7. Cord and plug.

ACCESSORIES:

1. Barrel lock (factory installed).

ITEM C-2 DUNNAGE RACK, 24" X 60" Quantity: 1

MANUFACTURER: New Age Industrial

MODEL: 2010

SIZE: 60" long x 24" wide x 12" high

FEATURES:

1. High tensile extruded aluminum, all welded construction.

2. 2,000 lbs. capacity.

ITEM C-3 DROP-IN HAND SINK Quantity: 1

MANUFACTURER: Advance Tabco

MODEL: DI-1-35

SPECIAL DESCRIPTION:

1. Drop-In Hand Sink to be installed in Item #C-4 Back Counter (furnished by others). See plan for location.

2. Food Service Equipment Contractor to deliver sink to Millwork Contractor for installation into counter.

STANDARD FEATURES:

1. Sink bowl is 10” x 14” x 5” deep.

2. 20 gauge type 304 stainless steel construction.

3. Self-Rim design.

4. Includes 3" basket drain and 4" O.C. knock-outs for faucet.

ACCESSORIES:

1. Delete standard faucet.

2. One (1) T & S Brass & Bronze Works Model No. B-0325 Swivel Pantry Faucet.

ITEM C-4 BACK COUNTER Quantity: N.I.C.-1 By Other Trades

To be supplied and installed by Millwork Contractor.

ITEM C-5 MICROWAVE OVEN Quantity: 1

MANUFACTURER: Panasonic

MODEL: NE-1025

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. 1,000 watts of cooking power.

2. 6 minute dial timer marked in 15 second increments.

3. Stainless steel front.

ITEM C-6 BAKERY CASE Quantity: 1

MANUFACTURER: Structural Concepts

MODEL: HVAD48SS

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Acrylic lift-up front doors for self-service.

2. Holds six (6) 18" x 26" trays.

3. Laminated exterior. Color to be selected by Architect.

4. Clear glass rear sliding doors w/o lock.

5. Full end panels with mirror interior.

6. Two (2) adjustable and removable wire rack shelves.

7. Top and shelf lights (T-8 fluorescent).

8. Recessed front storage with tissue box holder.

9. 12 ft. power cord.

ACCESSORIES:

1. Six (6) Cambro fiberglass market display trays 18" X 26", Model 1826MT for use in Bakery Case. NSF listed color to be "White".

ITEM C-7 P.O.S. SYSTEM Quantity: N.I.C.-1 By Others

Food Service Equipment Contractor to show 120/60/1 electrical service for P.O.S. System on his electrical rough-in drawing.

ITEM C-8 FRONT COUNTER Quantity: N.I.C.-1 By Other Trades

To be supplied and installed by Millwork Contractor.

ITEM C-9 REFRIGERATED SELF-SERVICE CASE Quantity: 1

MANUFACTURER: Structural Concepts

MODEL: HV48RSSRD

ELECTRICAL: 120/60/1
NEMA 5-20P

STANDARD FEATURES:

1. Breeze-E (Type II) energy efficient, self-contained refrigeration system with front air intake and rear discharge.

2. Open reach-in front.

3. Clear glass rear sliding doors.

4. Laminated exterior. Color to be selected by Architect.

5. Full end panels with mirror interior.

6. Three (3) adjustable and removable clear glass shelves.

7. Top and shelf lights (T-8 fluorescent).

8. 6 ft. power cord.

ITEM C-10 SHELVING UNIT, 24" X 48" Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(5) A2448NC Wire Shelves
(4) 74P Posts
1 unit

SIZE: 24” x 48”

FINISH: Chrome shelves and plated posts

SPECIAL DESCRIPTION:

1. Individual unit consisting of five shelves. The bottom shelf is 7” from the floor. All the remaining shelves are spaced equally with the top shelf finishing even with the top of the posts. The overall height is 74”. Unit has four plated posts.

ITEM C-11 TRASH AND CONDIMENT COUNTER Quantity: 1 LOT

MANUFACTURER: Peterson Furniture International or equal

MODEL: Custom

SIZE: 45¼" long x 23½" wide x 39¼" high

SPECIAL DESCRIPTION:

1. Unit is combination waste/storage unit with fully laminated top surface.

2. Constructed of particle board with high-pressure laminated plastic exterior and thermally fused melamine backed interior. All exposed wood edges to be banded in laminate. Swing door on waste cabinet has routed "THANK YOU".

3. Waste cabinet includes 35 gal. capacity rigid plastic liner. Main access door to be mounted on concealed, self-closing Euro-style hinges. Waste cabinet to be located on left.

4. Storage module to be open front cabinet with two (2) adjustable shelves. Module to be same size as waste cabinet. Storage module to be located on right.

5. Entire cabinet to be mounted on adjustable nylon-footed furniture glides.

6. Laminate color to be selected by Architect.

NOTE! THE FOLLOWING ITEMS ARE LOCATED IN THE DINING HALL KITCHEN:

ITEM 1 WALK-IN COOLER/FREEZER Quantity: 1 LOT

MANUFACTURER: Thermo-Kool

MODELS: Walk-In is pre-fabricated, precision-formed and modular.
Cooler - #MOH025X63/TKM-1800 with EC motors and timed air defrost
2½ H.P. Medium Temperature/R404A refrigerant
Freezer - #MOZ060L63/(2)TKL-1201 with EC motors and Smart Defrost Kit
6 H.P Low Temperature/R404A refrigerant

ELECTRICAL: 208/60/3 for condensing units
208/60/1 for freezer evaporator
115/60/1 for cooler evaporator
115/60/1 for lights, door heaters, heated windows (frame and glass), heated vent (freezer only), Modularms, air curtains and receptacle for heat tape.

REFRIGERANT: R-404A or latest type to meet HCFC reduction regulations

SIZE: 28'-6" x 23'-10" x 8'-6" High O.A.
Inside dimensions must be held for shelving and carts as shown.
Cooler: 13'-0" x 17'-0" x 7'-10" High (Actual I.D.)
Freezer: 14'-6" x 23'-2" x 7'-10" High (Actual I.D.)

Doors must be positioned as shown on the drawing for shelving and carts to be located as shown.

SPECIAL DESCRIPTION:

Walk-in shall have a complete set of installation instructions and erection drawings. All panels shall have panel identification corresponding with erection drawings to facilitate rapid and accurate field erection. All specifications apply to cooler and freezer unless indicated otherwise.

NOTE! MANUFACTURER TO PREASSEMBLE WALK-IN AT FACTORY PRIOR TO SHIPPING AND PROVIDE PHOTO OR PROOF TO F.S.E.C. THAT ASSEMBLY WAS COMPLETED SUCCESSFULLY.

PANEL CONSTRUCTION

Each panel shall consist of inner and outer metal skins, precision-formed on steel dies, equipped with cam-action locking devices. The locking devices shall be operable from inside the walk-in and a wrench shall be supplied. Panel sides shall be roll-formed to provide a flange that extends into the foam insulation for superior strength and adhesion. All panels, except corner panels, shall be 11-1/2", 23", 34-1/2" or 46" wide. (Exception: Custom size panels may be provided to meet special size requirements). To insure exact alignment and maximum strength, corner panels shall be exact 90 degree angles and measure 12" in each horizontal exterior dimension. Doors shall be mounted in panels 46" wide, except where larger openings are required. Insulation must be foamed-in-place urethane with minimum of 4" thickness. Locking devices shall be no more than 46" apart. All panels shall be connected one to another by placing the foamed tongue of one panel into the foamed groove of the adjoining panel, before actuating the cam-action locking device. The cam-action locking devices are to be actuated from inside the walk-in to permit erection against a wall or inside a room with close tolerances. Press-fit plug buttons shall be provided to seal wrench holes after erection is complete. A locking wrench shall be supplied as part of the walk-in. NSF listed gaskets shall be foamed-in-place to the male side of all panels, on both interior and exterior. Gaskets shall be impervious to stains, greases, oil and mildew. No wood or pressed board is used on panel perimeters, around door openings or for reinforcement. Construction shall be as approved by the National Sanitation Foundation and shall bear the NSF® Seal of Approval affixed to the interior of each door panel.

Floor is recessed. Coordinate floor and threshold of walk-in cooler/freezer with finished floor of the kitchen to assure that floor of walk-in is level and even with kitchen floor. Mobile racks and carts must move easily into and out of the compartments. Recess is 4" below finished floor of kitchen. Floor of walk-in cooler/freezer is not covered with quarry tile.

PARTITIONS

When specified or shown on drawing, walk-in shall be divided into compartments by use of insulated panels. Panels shall be constructed in accordance with specifications for all panels. Tongue and groove foam fabrication shall provide the thermal break between cooler and freezer compartments. Wall “T” panels shall be 23” x 11½” symmetrical tee. Heater wires are not required.

PANEL FINISH

Metal finish of panels shall be as follows.

INTERIOR walls are 26 ga. stucco embossed galvanized steel with white baked-on enamel.
INTERIOR ceiling is 26 ga. smooth galvanized steel with white baked-on enamel.
INTERIOR floor is foamed-in-place 1/8” aluminum diamond treadplate.
UNEXPOSED EXTERIOR WALLS AND CEILING are 26 ga. stucco embossed galvanized steel.
EXPOSED EXTERIOR WALLS including door section are 26 ga. stucco embossed galvanized steel with white baked-on enamel.

INSULATION

Insulation shall be 4" thick rigid zero ozone depleting HFC 134a blown Class 1 urethane foam, with tenacious bond to inner and outer metal pans. The “K” factor (Thermal Conductivity) shall be no more than .13 B.T.U. per hour, per square foot, per inch thickness, per degree Fahrenheit. The “U” factor (Overall coefficient of heat transfer) shall not exceed .031 for 4" panels. Insulation shall have a 97% closed cell structure to prevent moisture absorption. The “R” factor efficiency shall be 32.0 or greater for 4" panels. Insulation shall have a fire hazard classification in compliance with ASTM-E-84 (UL 723) with a flame spread rating of 25 or less and certified with a UL label.

RATINGS AND INDEPENDENT TESTING

Pre-submitted proof must accompany all proposals establishing conformance with the following:

National Sanitation Foundation (NSF), Standard 7 construction
Underwriters’ Laboratories (UL) approval of door electrical circuit assembly
Compliance with fire hazard classification ASTM-E84 (L723)
Factory Mutual Standard 4880 Approval Requirements for Class 1 Fire (I.D. #OR3A1 AM)

Each compartment must bear the National Sanitation Foundation Seal of Approval and U.L. label.

HINGED WALK-IN DOOR (HEAVY-DUTY)

34" x 76"

Door shall be flush-mounted, infitting type with door panel construction the same as for other panels. Insulation shall be same thickness and type as used in other panels. Door and door section shall be listed by Underwriters Laboratories.

Door shall be hinged as shown on the drawing.

Door shall be equipped with a magnetic gasket around perimeter, a sweep gasket at bottom, a positive action hydraulic door closer and latch. Hardware shall have provisions for locking and a safety release which prevents entrapment of personnel within the box. Door pull handle to have built-in cylinder lock and padlock provision. Latch to have polished chrome finish. Provide two (2) keys per lock.

Door shall be self-closing with three (3) strap-type, cam-lift hinges. Door hinges shall have positive “hold-open” feature allowing door to remain open unaided, when opened to 180 degree position. Hinges shall have polished chrome finish.

Door frame shall consist of heavy reinforced steel “U” channel frame to encompass entire perimeter of opening, foamed-in-place to give extra support and rigidity. An armored anti-sweat heater cable shall be run in a breaker strip located behind a removable heavy gauge stainless steel trim for easy access to heater cable. Heater cable shall be run under threshold consisting of heavy reinforcement “U” channel, breaker strip and heavy gauge stainless steel threshold. Heater cable is designed to prevent frost and condensation build-up around door (freezer and cooler). An additional unconnected heater cable shall be provided in breaker strip to be used as a replacement in the event the connected heater cable ceases to operate. A thermostat control for the heater cable shall be provided and shall turn off heater when temperature rises above 45 degrees F.

Entrance door section shall be provided with a Kason #1806 LED type vapor proof light fixture installed in the header over the door connected to an automatic light control (See Alarm System under Accessories and Optional Equipment). Alarm System includes illuminated push button for light control inside box. Concealed conduit and wiring shall be standard on door section.

A 2” diameter flush-mounted dial thermometer shall be included with each door section to indicate inside temperature, unless alarm/monitor with temperature read-out is specified.

Single point electrical connection for all accessories including light, door heater, heated window (frame and glass), Modularm, air curtain and heated vent (freezer, only) shall be provided for each entrance door section. Provide metal backing in header above entrance door for air curtain accessory as well as provisions for door switch (See Air Curtain under Accessories and Optional Equipment).

ACCESSORIES AND OPTIONAL EQUIPMENT

Observation Window

Walk-in entrance doors shall be provided with a nominal 14" x 24" observation window. Window glass, which shall be replaceable, to be triple pane tempered safety glass. The

frame and glass are heated.

Pressure Relief Port

A pressure relief port shall be provided to equalize atmospheric pressure inside and outside walk-in freezer caused by temperature changes due to product loading, door opening and defrost cycles. Size of cooler may necessitate heated pressure relief port. Relief port shall be provided with 115/60/1 AC. heater element to prevent freezing. In all freezer applications up through 3 H. P., a single 3" diameter relief port must be included. On all freezer applications of 4 H.P. and larger, two (2) or more relief ports must be provided, or one (1) single relief port of sufficient size to equalize pressure as required.

Lights (Field-Mounted)

Cooler – Provide two (2) Kason #1810 LED type light fixtures with lamp. See drawing.
Freezer – Provide three (3) Kason #1810 LED type light fixtures with lamp. See drawing.

Food Service Equipment Contractor installs fixtures for Electrical Contractor to wire to junction box provided by manufacturer. Light fixtures are mounted to ceiling panels where shown on the drawings and are connected to the Modularm Model 75LC Multi-Monitor (See Alarm System) for automatic light control. Electrical Contractor provides and installs conduit and wiring on inside ceiling of box. See Installation Instructions this section for additional requirements.

Wainscot and Kick Plates

Provide and install 36” high 3/16” aluminum diamond tread-plate kick plates on both the exterior and interior of all Walk-In Cooler/Freezer doors. Provide additional 36” high 3/16” aluminum diamond tread-plate wainscot for the exposed exterior of the walk-in to be installed in field.

Backing/Special Conditions

Provide metal backing in door panels for Item #92 Air Curtain. See Floor Plan.

Trim

Supply and install trim made from material with same finish as exposed exterior where walk-in cooler/freezer is adjacent to walls; seal to walls and boxes for rodent, dirt and moisture protection. Attach trim to box and wall with non-corrosive fasteners and seal to wall and box with clear silicon caulking. Extend trim to height of dropped ceiling or enclosure panel and down to top of cove base. Coordinate with tile or epoxy base at front of box and enclosure panel or trim. Design objective for trim is to seal all cracks/crevices to prevent entry of vermin and water.

Cove Base

Food Service Equipment Contractor supplies and installs 5” high stainless steel cove base along the exposed front of walk-in cooler/freezer at the seam between the walk-in box and kitchen floor to prevent water, dirt and vermin from getting under box. Cove base trim to be sealed to box and floor. Base to be set into sealant for use with metal and masonry with a heat tolerance of at least 400°F. Seal to floor and box with same type of clear sealant.

Enclosure Panel

Supply and install enclosure panel (made from material with same finish as exposed exterior) if height of box is lower than finished ceiling. Enclosure panel to be made in removable sections. Provide ceiling trim if height of box is same as height of finished ceiling. Enclosure panel or ceiling trim to extend below seam between ceiling and wall panels of the walk-in. Attach panel or ceiling trim to box with non-corrosive fasteners and seal to ceiling and box with clear silicon caulking. See Installation Instructions, Section 11400, for type of clear silicon caulking to use.

Alarm System

Supply and install Modularm Model 75LC Multi-Monitor (or equal) in both cooler and freezer. Alarm to be flush mounted in door panel section, foamed in place and sealed by manufacturer. Multi-Monitor to include temperature alarm, door ajar alarm, AC power failure alarm, panic alarm and automatic light control. Panic alarm to be mounted inside box and include illuminated push button for light control. Unit to be factory wired to junction box in door panel along with light, door heater, air curtain and other electrical accessories. Unit to have battery back-up in case of power failure. Alarm to provide audible and visual notification. Note: Both cooler and freezer to have 75LC Multi-Monitors, one at each door at Vestibule off Receiving area. Furnish both automatic and manual switches at doors off Dry Storage Room so that either control will operate all lights inside cooler as well as serve as panic alarm and exit indicator in case of power failure.

Air Curtain

Install Berner Air Curtain with Control Package over all entrance doors to walk-in (See Item #92). Air curtain to be wired to junction box on top of walk-in along with light, door heater, heated window and Modularm for single point electrical connection. Air curtain installation to include magnetic reed door switch for activation of air curtain when door is opened. Air Curtain to be supplied by Food Service Equipment Contractor.

REFRIGERATION SYSTEMS

Systems for cooler/freezer are for outside application. Units are to be located on roof. Verify location. Compressors are hermetic or scroll type. Systems are U.L. Approved and sized to maintain -10˚F. in the freezer and 34°F. in the cooler under storage conditions. Cooler refrigeration is sized for storage of 16 cases of milk. Freezer evaporator coil defrost cycle is time initiated, temperature terminated to allow for energy efficient, cost saving defrost. InterLink Smart Defrost Kit shall be provided for freezer to eliminate unnecessary defrosts and lower operational costs, provide more consistent box temperatures and enhance product integrity.

Systems are supplied with pump down cycle, weather proof (low ambient) controls and housing. Systems are built-up remote. Systems are equipped with headmaster control for low ambient operation instead of fan cycling and crankcase heater and pressure control valves.

Condensing units are completely factory assembled on a galvanized steel base. The following components are mounted and assembled by the manufacturer: Liquid line vibration absorber (eliminator); dual pressure control; head pressure control (flooding valve); suction line vibration absorber (eliminator); pre-wired electrical control panel with circuit breaker; suction line filter; liquid line drier; sight glass; crank case heater; low ambient kit; liquid and suction line kit with service valve; heavy duty channel leg base with lockable snap down hood latch; hinged weather hood. Weather hood must be removable without the use of tools.

Weather hoods are manufactured from 26 gauge embossed galvalume to prevent corrosion. Hood is reinforced with 1¼" x 1¼" angle iron around top perimeter and across the top to prevent collapse from weight.

Copeland compressor/condensing units and Bohn or Russell evaporator coils are required.

All work and materials are in full accordance with Local and/or State ordinances.

INSTALLATION INSTRUCTIONS

Electrical Contractor will supply and run conduit and power wiring to cooler condensing unit and cooler evaporator coil. See Electrical drawings.

Electrical Contractor will supply and run conduit and power wiring to freezer condensing unit and freezer evaporator coils and conduit and control wiring between freezer evaporator coils and defrost time clock. See Electrical drawings.

Food Service Equipment Contractor to supply heat tape for condensate drain line in freezer. Electrical Contractor to wire heat tape into separate circuit or furnish convenience outlet for same. See Electrical drawings.

Electrical Contractor to supply conduit and wiring and make connection to junction box provided and installed by the manufacturer for all lights, heated windows, door heaters, alarms, and door panel accessories. Lights over doors are installed by factory. Additional lights (if specified) are field installed by Food Service Equipment Contractor or approved installer. Conduit and wiring for additional lights is supplied and installed by Electrical Contractor on the inside ceiling of the box. Electrical Contractor to provide conduit suitable for moist conditions. CONDUIT SEAL-OFFS ARE REQUIRED FOR ALL ELECTRICAL CONNECTIONS. All fasteners, etc., must be non-corrosive and mastic provided between dissimilar metals to prevent rusting.

Food Service Equipment Contractor or approved installer to supply and install refrigeration lines. Food Service Equipment Contractor is responsible for determining length of lines needed.

Condensation drain lines are supplied and installed by Food Service Equipment Contractor or approved installer.

See Walk-in Layout, Electrical, and Mechanical drawings.

Installation will be performed by the Food Service Equipment Contractor or an approved professional refrigeration company. The installation includes, but is not limited to the following:

Building the box.

Setting the compressor rack system/condensing unit assemblies.

Hanging the evaporator coils - verify locations.

Installation of all accessories unless indicated otherwise.

Installation of all refrigeration lines which includes supplying, running and connecting.

Installation of the drain lines - Verify locations; supply and install tubing. Electric heat tape for freezer to be supplied and installed by Food Service Equipment Contractor. Refer to Mechanical and Food Service Layout drawings.

Food Service Equipment Contractor seals and insulates all penetrations in the walk-in, regardless of who makes the penetration. Conduit seal-offs are required for all electrical connections and are supplied by the Electrical Contractor. Insulation and sealing is required between conduit and wiring and inside conduit where any type of connection or penetration is made. Food Service Equipment Contractor is responsible for informing and coordinating the use of conduit seal-offs by other contractors and for providing proper insulation and sealing for all other penetrations.

On-site supervision and consultation is provided to other contractors by Food Service Equipment Contractor to ensure that all requirements for a proper installation are met.

Perform start-up and adjust. Test, check, and adjust all components and accessories and pull to proper operating temperatures.

Calibrate thermometers, etc.

Box is to be cleaned inside and out before refrigeration is started up. Cleaning includes the removal of all unnecessary stickers.

Hard copper is required for entire job. All refrigerant piping is ACR copper tubing, hard drawn. Wrought copper sweat fittings are used on the hard-drawn tubing. Slope suction line down in direction of flow 1/8" per foot. Where vertical risers of more than 5 feet occur in a suction line, the riser is trapped at the bottom.

Freezer refrigeration system is set for three (3) defrost cycles with each cycle in defrost 30 minutes as a minimum. Defrost times are set to avoid the initial arrival of employees

or periods of heavy usage during the morning and are identified in the Operation and Maintenance Manuals. Time clock for freezer can be overridden by Smart Defrost Kit if defrost is not needed.

Manufacturer identifies local service agency before or at start-up and adjustment. Installer and local service agency as designated by manufacturer are present for start-up and adjustments.

System is ready for use when the Owner is prepared to occupy the operation.

INFORMATION FOR GENERAL CONTRACTOR:

Steel reinforced concrete pad for walk-in box is prepared and installed by General Contractor. Pad for the cooler is recessed a min. of 4” below finished floor of the kitchen (verify). Refer to details on Food Service Equipment drawings. See drawings for dimensions. Coordination with Food Service Equipment Contractor is required to determine depth to ensure that walk-in threshold and walk-in finished floor are level with finished floor of the kitchen. Pad area must be transit level and trowel smooth and capable of sustaining weight of box and contents.

Floor of walk-in cooler/freezer will not be covered with quarry tile. Floor of walk-in is 4" thick. Pad for walk-in box is recessed.

Food Service Equipment Contractor supplies and installs stainless steel cove base around walk-in to prevent dirt, water and vermin from getting under box. Tile Contractor must fill in any space between the front edge of the pit and the front of the box with grout.

Condensing units to be located on roof (verify location). General Contractor is responsible for cutting opening in roof and providing pitch pocket for refrigeration lines. General Contractor to provide reinforced platform or treated 4” x 4” wood members for mounting condensing units. Minimum 18” clearances are required between condensing unit assemblies for servicing. Compressor/condensing unit assemblies to be located so as to provide unrestricted air flow. Assemblies to be a minimum of 10’-0” from other heat or grease producing equipment.

Height of walk-in cooler is 8'-6”. Access above walk-in box is required for installation and service.

Sprinkler heads inside or over units must be loaded with a dry fire suppression substance.

Plumbing lines (supply, waste, drain, roof drain, sewer, condensation, slurry, etc.) cannot be routed over walk-in boxes.

Ceiling hangers supplied and installed by Food Service Equipment Contractor may be required because size of box.

WARRANTIES:

1. One year parts, service, labor, mileage, time and transportation warranty

on all parts supplied and all work performed.

2. Five year, non-prorated, replacement warranty for the compressor/condensing unit assemblies.

3. Foamed-in-place panels are warranted by manufacturer to be free from defects in material and workmanship under normal use and service for a period of ten (10) years.

ITEM 2 WALK-IN COOLER/FREEZER Quantity: 1 LOT

MANUFACTURER: Thermo-Kool

MODELS: Walk-In is pre-fabricated, precision-formed and modular.
Cooler - #MOH015X63/TKM-1300 with EC motors and timed air defrost
1½ H.P. Medium Temperature/R404A refrigerant
Freezer - #MOZ035L63/TKL-1401 with EC motors and Smart Defrost Kit
3½ H.P Low Temperature/R404A refrigerant

ELECTRICAL: 208/60/3 for condensing units
208/60/1 for freezer evaporator
115/60/1 for cooler evaporator
115/60/1 for lights, door heaters, heated windows (frame and glass), heated vent (freezer only), Modularms, air curtains and receptacle for heat tape.

REFRIGERANT: R-404A or latest type to meet HCFC reduction regulations

SIZE: 26’-4” x 14’-5” x 8’-6” High O.A.
Inside dimensions must be held for shelving and carts as shown.
Cooler: 12’-5½” x 13’-9” x 7’-10” High (Actual I.D.)
Freezer: 12’-10½” x 13’-9” x 7’-10” High (Actual I.D.)

Doors must be positioned as shown on the drawing for shelving and carts to be located as shown.

SPECIAL DESCRIPTION:

Walk-in shall have a complete set of installation instructions and erection drawings. All panels shall have panel identification corresponding with erection drawings to facilitate rapid and accurate field erection. All specifications apply to cooler and freezer unless indicated otherwise.

NOTE! MANUFACTURER TO PREASSEMBLE WALK-IN AT FACTORY PRIOR TO SHIPPING AND PROVIDE PHOTO OR PROOF TO F.S.E.C. THAT ASSEMBLY WAS COMPLETED SUCCESSFULLY.

PANEL CONSTRUCTION

Each panel shall consist of inner and outer metal skins, precision-formed on steel dies, equipped with cam-action locking devices. The locking devices shall be operable from inside the walk-in and a wrench shall be supplied. Panel sides shall be roll-formed to provide a flange that extends into the foam insulation for superior strength and adhesion. All panels, except corner panels, shall be 11-1/2", 23", 34-1/2" or 46” wide. (Exception: Custom size panels may be provided to meet special size requirements). To insure exact alignment and maximum strength, corner panels shall be exact 90 degree angles and measure 12” in each horizontal exterior dimension. Doors shall be mounted in panels 46" wide, except where larger openings are required. Insulation must be foamed-in-place urethane with minimum of 4" thickness. Locking devices shall be no more than 46” apart. All panels shall be connected one to another by placing the foamed tongue of one panel into the foamed groove of the adjoining panel, before actuating the cam-action locking device. The cam-action locking devices are to be actuated from inside the walk-in to permit erection against a wall or inside a room with close tolerances. Press-fit plug buttons shall be provided to seal wrench holes after erection is complete. A locking wrench shall be supplied as part of the walk-in. NSF listed gaskets shall be foamed-in-place to the male side of all panels, on both interior and exterior. Gaskets shall be impervious to stains, greases, oil and mildew. No wood or pressed board is used on panel perimeters, around door openings or for reinforcement. Construction shall be as approved by the National Sanitation Foundation and shall bear the NSF® Seal of Approval affixed to the interior of each door panel.

Floor is recessed. Coordinate floor and threshold of walk-in cooler/freezer with finished floor of the kitchen to assure that floor of walk-in is level and even with kitchen floor. Mobile racks and carts must move easily into and out of the compartments. Recess is 4” below finished floor of kitchen. Floor of walk-in cooler/freezer is not covered with quarry tile.

PARTITIONS

When specified or shown on drawing, walk-in shall be divided into compartments by use of insulated panels. Panels shall be constructed in accordance with specifications for all panels. Tongue and groove foam fabrication shall provide the thermal break between cooler and freezer compartments. Wall “T” panels shall be 23” x 11½” symmetrical tee. Heater wires are not required.

PANEL FINISH

Metal finish of panels shall be as follows.

INTERIOR walls are 26 ga. stucco embossed galvanized steel with white baked-on enamel.
INTERIOR ceiling is 26 ga. smooth galvanized steel with white baked-on enamel.
INTERIOR floor is foamed-in-place 1/8” aluminum diamond treadplate.
UNEXPOSED EXTERIOR WALLS AND CEILING are 26 ga. stucco embossed galvanized steel.
EXPOSED EXTERIOR WALLS including door section are 26 ga. stucco embossed

galvanized steel with white baked-on enamel.

INSULATION

Insulation shall be 4" thick rigid zero ozone depleting HFC 134a blown Class 1 urethane foam, with tenacious bond to inner and outer metal pans. The “K” factor (Thermal Conductivity) shall be no more than .13 B.T.U. per hour, per square foot, per inch thickness, per degree Fahrenheit. The “U” factor (Overall coefficient of heat transfer) shall not exceed .031 for 4" panels. Insulation shall have a 97% closed cell structure to prevent moisture absorption. The “R” factor efficiency shall be 32.0 or greater for 4" panels. Insulation shall have a fire hazard classification in compliance with ASTM-E-84 (UL 723) with a flame spread rating of 25 or less and certified with a UL label.

RATINGS AND INDEPENDENT TESTING

Pre-submitted proof must accompany all proposals establishing conformance with the following:

National Sanitation Foundation (NSF), Standard 7 construction
Underwriters’ Laboratories (UL) approval of door electrical circuit assembly
Compliance with fire hazard classification ASTM-E84 (L723)
Factory Mutual Standard 4880 Approval Requirements for Class 1 Fire (I.D. #OR3A1 AM)

Each compartment must bear the National Sanitation Foundation Seal of Approval and U.L. label.

HINGED WALK-IN DOOR (HEAVY-DUTY)

34" x 76"

Door shall be flush-mounted, infitting type with door panel construction the same as for other panels. Insulation shall be same thickness and type as used in other panels. Door and door section shall be listed by Underwriters Laboratories.

Door shall be hinged as shown on the drawing.

Door shall be equipped with a magnetic gasket around perimeter, a sweep gasket at bottom, a positive action hydraulic door closer and latch. Hardware shall have provisions for locking and a safety release which prevents entrapment of personnel within the box. Door pull handle to have built-in cylinder lock and padlock provision. Latch to have polished chrome finish. Provide two (2) keys per lock.

Door shall be self-closing with three (3) strap-type, cam-lift hinges. Door hinges shall have positive “hold-open” feature allowing door to remain open unaided, when opened to 180 degree position. Hinges shall have polished chrome finish.

Door frame shall consist of heavy reinforced steel “U” channel frame to encompass entire perimeter of opening, foamed-in-place to give extra support and rigidity. An armored anti-sweat heater cable shall be run in a breaker strip located behind a removable heavy gauge

stainless steel trim for easy access to heater cable. Heater cable shall be run under threshold consisting of heavy reinforcement “U” channel, breaker strip and heavy gauge stainless steel threshold. Heater cable is designed to prevent frost and condensation build-up around door (freezer and cooler). An additional unconnected heater cable shall be provided in breaker strip to be used as a replacement in the event the connected heater cable ceases to operate. A thermostat control for the heater cable shall be provided and shall turn off heater when temperature rises above 45 degrees F.

Entrance door section shall be provided with a Kason #1806 LED type vapor proof light fixture installed in the header over the door connected to an automatic light control (See Alarm System under Accessories and Optional Equipment). Alarm System includes illuminated push button for light control inside box. Concealed conduit and wiring shall be standard on door section.

A 2” diameter flush-mounted dial thermometer shall be included with each door section to indicate inside temperature, unless alarm/monitor with temperature read-out is specified.

Single point electrical connection for all accessories including light, door heater, heated window (frame and glass), Modularm, air curtain and heated vent (freezer, only) shall be provided for each entrance door section. Provide metal backing in header above entrance door for air curtain accessory as well as provisions for door switch (See Air Curtain under Accessories and Optional Equipment).

ACCESSORIES AND OPTIONAL EQUIPMENT

Observation Window

Walk-in entrance doors shall be provided with a nominal 14" x 24" observation window. Window glass, which shall be replaceable, to be triple pane tempered safety glass. The frame and glass are heated.

Pressure Relief Port

A pressure relief port shall be provided to equalize atmospheric pressure inside and outside walk-in freezer caused by temperature changes due to product loading, door opening and defrost cycles. Size of cooler may necessitate heated pressure relief port. Relief port shall be provided with 115/60/1 AC. heater element to prevent freezing. In all freezer applications up through 3 H. P., a single 3" diameter relief port must be included. On all freezer applications of 4 H.P. and larger, two (2) or more relief ports must be provided, or one (1) single relief port of sufficient size to equalize pressure as required.

Lights (Field-Mounted)

Cooler – Provide two (2) Kason #1810 LED type light fixtures with lamp. See drawing.
Freezer – Provide two (2) Kason #1810 LED type light fixtures with lamp. See drawing.

Food Service Equipment Contractor installs fixtures for Electrical Contractor to wire to junction box provided by manufacturer. Light fixtures are mounted to ceiling panels where

shown on the drawings and are connected to the Modularm Model 75LC Multi-Monitor (See Alarm System) for automatic light control. Electrical Contractor provides and installs conduit and wiring on inside ceiling of box. See Installation Instructions this section for additional requirements.

Wainscot and Kick Plates

Provide and install 36” high 3/16” aluminum diamond tread-plate kick plates on both the exterior and interior of all Walk-In Cooler/Freezer doors. Provide additional 36” high 3/16” aluminum diamond tread-plate wainscot for the exposed exterior of the walk-in to be installed in field.

Backing/Special Conditions

Provide metal backing in door panels for Item #92 Air Curtain. See Floor Plan.

Trim

Supply and install trim made from material with same finish as exposed exterior where walk-in cooler/freezer is adjacent to walls; seal to walls and boxes for rodent, dirt and moisture protection. Attach trim to box and wall with non-corrosive fasteners and seal to wall and box with clear silicon caulking. Extend trim to height of dropped ceiling or enclosure panel and down to top of cove base. Coordinate with tile or epoxy base at front of box and enclosure panel or trim. Design objective for trim is to seal all cracks/crevices to prevent entry of vermin and water.

Cove Base

Food Service Equipment Contractor supplies and installs 5” high stainless steel cove base along the exposed front of walk-in cooler/freezer at the seam between the walk-in box and kitchen floor to prevent water, dirt and vermin from getting under box. Cove base trim to be sealed to box and floor. Base to be set into sealant for use with metal and masonry with a heat tolerance of at least 400°F. Seal to floor and box with same type of clear sealant.

Enclosure Panel

Supply and install enclosure panel (made from material with same finish as exposed exterior) if height of box is lower than finished ceiling. Enclosure panel to be made in removable sections. Provide ceiling trim if height of box is same as height of finished ceiling. Enclosure panel or ceiling trim to extend below seam between ceiling and wall panels of the walk-in. Attach panel or ceiling trim to box with non-corrosive fasteners and seal to ceiling and box with clear silicon caulking. See Installation Instructions, Section 11400, for type of clear silicon caulking to use.

Alarm System

Supply and install Modularm Model 75LC Multi-Monitor (or equal) in both cooler and freezer. Alarm to be flush mounted in door panel section, foamed in place and sealed by manufacturer. Multi-Monitor to include temperature alarm, door ajar alarm, AC power failure alarm, panic alarm and automatic light control. Panic alarm to be mounted inside box and include illuminated push button for light control. Unit to be factory wired to junction box in door panel along with light, door heater, air curtain and other electrical accessories. Unit to have battery back-up in case of power failure. Alarm to provide audible and visual notification.

Air Curtain

Install Berner Air Curtain with Control Package over all entrance doors to walk-in (See Item #92). Air curtain to be wired to junction box on top of walk-in along with light, door heater, heated window and Modularm for single point electrical connection. Air curtain installation to include magnetic reed door switch for activation of air curtain when door is opened. Air Curtain to be supplied by Food Service Equipment Contractor.

REFRIGERATION SYSTEMS

Systems for cooler/freezer are for outside application. Units are to be located on roof. Verify location. Compressors are hermetic or scroll type. Systems are U.L. Approved and sized to maintain -10˚F. in the freezer and 34°F. in the cooler under storage conditions. Cooler refrigeration is sized for storage of 16 cases of milk. Freezer evaporator coil defrost cycle is time initiated, temperature terminated to allow for energy efficient, cost saving defrost. InterLink Smart Defrost Kit shall be provided to eliminate unnecessary defrosts and lower operational costs, provide more consistent box temperatures and enhance product integrity.

Systems are supplied with pump down cycle, weather proof (low ambient) controls and housing. Systems are built-up remote. Systems are equipped with headmaster control for low ambient operation instead of fan cycling and crankcase heater and pressure control valves.

Condensing units are completely factory assembled on a galvanized steel base. The following components are mounted and assembled by the manufacturer: Liquid line vibration absorber (eliminator); dual pressure control; head pressure control (flooding valve); suction line vibration absorber (eliminator); pre-wired electrical control panel with circuit breaker; suction line filter; liquid line drier; sight glass; crank case heater; low ambient kit; liquid and suction line kit with service valve; heavy duty channel leg base with lockable snap down hood latch; hinged weather hood. Weather hood must be removable without the use of tools.

Weather hoods are manufactured from 26 gauge embossed galvalume to prevent corrosion. Hood is reinforced with 1¼" x 1¼" angle iron around top perimeter and across the top to prevent collapse from weight.

Copeland compressor/condensing units and Bohn or Russell evaporator coils are required.

All work and materials are in full accordance with Local and/or State ordinances.

INSTALLATION INSTRUCTIONS

Electrical Contractor will supply and run conduit and power wiring to cooler condensing unit and cooler evaporator coil. See Electrical drawings.

Electrical Contractor will supply and run conduit and power wiring to freezer condensing unit and freezer evaporator coil and conduit and control wiring between freezer evaporator coil and defrost time clock. See Electrical drawings.

Food Service Equipment Contractor to supply heat tape for condensate drain line in freezer. Electrical Contractor to wire heat tape into separate circuit or furnish convenience outlet for same. See Electrical drawings.

Electrical Contractor to supply conduit and wiring and make connection to junction box provided and installed by the manufacturer for all lights, heated windows, door heaters, alarms, and door panel accessories. Lights over doors are installed by factory. Additional lights (if specified) are field installed by Food Service Equipment Contractor or approved installer. Conduit and wiring for additional lights is supplied and installed by Electrical Contractor on the inside ceiling of the box. Electrical Contractor to provide conduit suitable for moist conditions. CONDUIT SEAL-OFFS ARE REQUIRED FOR ALL ELECTRICAL CONNECTIONS. All fasteners, etc., must be non-corrosive and mastic provided between dissimilar metals to prevent rusting.

Food Service Equipment Contractor or approved installer to supply and install refrigeration lines. Food Service Equipment Contractor is responsible for determining length of lines needed.

Condensation drain lines are supplied and installed by Food Service Equipment Contractor or approved installer.

See Walk-in Layout, Electrical, and Mechanical drawings.

Installation will be performed by the Food Service Equipment Contractor or an approved professional refrigeration company. The installation includes, but is not limited to the following:

Building the box.

Setting the compressor rack system/condensing unit assemblies.

Hanging the evaporator coils - verify locations.

Installation of all accessories unless indicated otherwise.

Installation of all refrigeration lines which includes supplying, running and connecting.

Installation of the drain lines - Verify locations; supply and install tubing. Electric heat tape

for freezer to be supplied and installed by Food Service Equipment Contractor. Refer to Mechanical and Food Service Layout drawings.

Food Service Equipment Contractor seals and insulates all penetrations in the walk-in, regardless of who makes the penetration. Conduit seal-offs are required for all electrical connections and are supplied by the Electrical Contractor. Insulation and sealing is required between conduit and wiring and inside conduit where any type of connection or penetration is made. Food Service Equipment Contractor is responsible for informing and coordinating the use of conduit seal-offs by other contractors and for providing proper insulation and sealing for all other penetrations.

On-site supervision and consultation is provided to other contractors by Food Service Equipment Contractor to ensure that all requirements for a proper installation are met.

Perform start-up and adjust. Test, check, and adjust all components and accessories and pull to proper operating temperatures.

Calibrate thermometers, etc.

Box is to be cleaned inside and out before refrigeration is started up. Cleaning includes the removal of all unnecessary stickers.

Hard copper is required for entire job. All refrigerant piping is ACR copper tubing, hard drawn. Wrought copper sweat fittings are used on the hard-drawn tubing. Slope suction line down in direction of flow 1/8" per foot. Where vertical risers of more than 5 feet occur in a suction line, the riser is trapped at the bottom.

Freezer refrigeration system is set for three (3) defrost cycles with each cycle in defrost 30 minutes as a minimum. Defrost times are set to avoid the initial arrival of employees or periods of heavy usage during the morning and are identified in the Operation and Maintenance Manuals. Time clock for freezer can be overridden by Smart Defrost Kit if defrost is not needed.

Manufacturer identifies local service agency before or at start-up and adjustment. Installer and local service agency as designated by manufacturer are present for start-up and adjustments.

System is ready for use when the Owner is prepared to occupy the operation.

INFORMATION FOR GENERAL CONTRACTOR:

Steel reinforced concrete pad for walk-in box is prepared and installed by General Contractor. Pad for the cooler is recessed a min. of 4” below finished floor of the kitchen (verify). Refer to details on Food Service Equipment drawings. See drawings for dimensions. Coordination with Food Service Equipment Contractor is required to determine depth to ensure that walk-in threshold and walk-in finished floor are level with finished floor of the kitchen. Pad area must be transit level and trowel smooth and capable of sustaining weight of box and contents.

Floor of walk-in cooler/freezer will not be covered with quarry tile. Floor of walk-in is 4" thick. Pad for walk-in box is recessed.

Food Service Equipment Contractor supplies and installs stainless steel cove base around walk-in to prevent dirt, water and vermin from getting under box. Tile Contractor must fill in any space between the front edge of the pit and the front of the box with grout.

Condensing units to be located on roof (verify location). General Contractor is responsible for cutting opening in roof and providing pitch pocket for refrigeration lines. General Contractor to provide reinforced platform or treated 4” x 4” wood members for mounting condensing units. Minimum 18” clearances are required between condensing unit assemblies for servicing. Compressor/condensing unit assemblies to be located so as to provide unrestricted air flow. Assemblies to be a minimum of 10’-0” from other heat or grease producing equipment.

Height of walk-in cooler is 8'-6”. Access above walk-in box is required for installation and service.

Sprinkler heads inside or over units must be loaded with a dry fire suppression substance.

Plumbing lines (supply, waste, drain, roof drain, sewer, condensation, slurry, etc.) cannot be routed over walk-in boxes.

Ceiling hangers supplied and installed by Food Service Equipment Contractor may be required because size of box.

WARRANTIES:

1. One year parts, service, labor, mileage, time and transportation warranty on all parts supplied and all work performed.

2. Five year, non-prorated, replacement warranty for the compressor/condensing unit assemblies.

3. Foamed-in-place panels are warranted by manufacturer to be free from defects in material and workmanship under normal use and service for a period of ten (10) years.

ITEM 3 SLICER Quantity: 1

MANUFACTURER: Hobart Corporation

MODEL: HS7

ELECTRICAL: 115/60/1
NEMA 5-15P

ACCESSORIES:

1. Two (2) Full Fences.

ITEM 4 MOBILE EQUIPMENT STAND Quantity: 1

MANUFACTURER: Food Warming Equipment Company, Inc.

MODEL: OTR-15-MSWT

FINISH: All stainless steel.

SPECIAL DESCRIPTION:

1. Caster locks must prevent table from moving when slicer is set on high speed.

STANDARD FEATURES:

1. Four locking casters.

2. Two (2) wing attachments.

ITEM 5 SALAD PREP TABLE Quantity: 1

MANUFACTURER: Approved Fabricator
T & S Brass and Bronze Works

MODEL: Custom

SIZE: Size and shape as shown on drawing.
Table is 8'-6" long x 30" wide x 34" high.

SPECIAL DESCRIPTION:

1. Front and side edges of table - marine edge.

2. Back of table - splash (overall height - 10") is provided. Backsplash is fabricated as described in the General Fabrication specifications.

3. Exposed rear and ends of backsplash are fully enclosed to the table top, integrally welded, finished and polished, and fully sealed by welding to meet NSF Requirements.

4. Double compartment sink - Size of each compartment is 20" x 20" x 14" deep. Faucet holes are provided. Fabricator is cautioned to locate holes so faucet handles clear backsplash.

5. Drainboard on right to be 6" longer in order to accommodate Item #6 Salad Dryer. Verify that unit will fit underneath table as shown on plan.

6. Crossrails must be supplied between each leg vertically and horizontally. Move crossrails to front when they interfere with plumbing connections in rear.

7. See General Fabrication and Installation Requirements.

ACCESSORIES:

1. One (1) T & S Brass and Bronze Works B-0129-VB with 96" hose length and a B-0156 add-on faucet with 12" nozzle, mixing valve and ball checks built-in (spring check spindle) to prevent cross flow of water. Mixing faucet is Eterna cartridge type construction with internal spring checks to prevent cross flow of water. Continuous-flow B-0970-FE vacuum breaker to maintain back-flow protection between the hose and outlet pipe and B-0107-C35 Low-Flow spray head are included. Provide T & S Brass and Bronze Works B-0230-K Installation Kit. Spray and faucet handles are installed to clear backsplash

2. Label spray/faucet assembly and deliver to Plumbing Contractor for installation.

ITEM 6 SALAD DRYER Quantity: 1

MANUFACTURER: Delfield

MODEL: SALD1

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Body is 18-ga. stainless steel.

2. Three (3) 4" dia. polyurethane locking stem casters.

3. Polyethylene plastic inner liner.

4. Adjustable on/off timer for drying times up to 5 minutes.

ITEM 7 WALL-MOUNTED SHELF, 12" X 48" Quantity: 2

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 12" wide x 48" long

SPECIAL DESCRIPTION:

1. See General Fabrication requirements for Wall Mounted Shelves.

2. Mount one shelf over Item 5 Salad Prep Table and one shelf over Item 44 Clean Dish Table where shown on plan. Both shelves to be installed at 60" AFF.

ITEM 8 PAN/TRAY RACK Quantity: 5

MANUFACTURER: New Age Industrial

MODEL: 4340

STANDARD FEATURES:

1. Universal Angle Slides spaced 5" O.C.; 12 sets each rack.

2. All aluminum heavy duty "D" tube construction.

3. Four (4) 6" platform type swivel casters, 2" x 6" with non-marking wheels.

4. Lifetime guarantee against rust and corrosion.

ITEM 9 PRODUCE RACK Quantity: 1

MANUFACTURER: Food Warming Equipment Company, Inc.

MODEL: OTR-PRODUCE 6

SPECIAL DESCRIPTION:

1. Spacing provided for combination of 6”, 9" and 12" deep Food Storage Boxes with Lids as made by Rubbermaid.

2. Load combination of boxes onto rack. Locate remaining boxes in dry food storage after cleaning.

ACCESSORIES:

1. All swivel polyurethane casters with brakes.

2. Perimeter bumper.

3. Three Rubbermaid Carb-x full size, 12" deep food storage boxes with lids.

4. Two Rubbermaid Carb-x full size, 9" deep food storage boxes with lids.

5. Six Rubbermaid Carb-x half size, 6" deep food storage boxes with lids.

6. Three Rubbermaid Carb-x full size 5" deep colanders.

ITEM 10 FOOD PROCESSOR Quantity: 1

MANUFACTURER: Hobart

MODEL: FP150

ELECTRICAL: 120/60/1
NEMA 5-15P

SPECIAL DESCRIPTION:

1. Peg racks for accessory plates to be mounted on wall over Item 5 Salad Prep Table on left side.

ACCESSORIES:

1. One (1) 6-Pack Plates which includes 1/16”, 5/32” slicer plates, 3/16” shredder plate, 7/32” slicer plate, 3/8” dicer, 3/8” heavy duty slicing plate, and (2) 3-peg wall racks. Cleaning brush.

2. One (1) 5/16” Shredder Plate.

3. One (1) 5/16” Julienne Plate.

4. One (1) extra 3-peg wall rack.

ITEM 11 BOILERLESS STEAMER WITH STAND Quantity: 1

MANUFACTURER: Cleveland

MODEL: 22CET6.1

ELECTRICAL: 208/60/3
NEMA 15-50P

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies water connection kit for steamer, labels and delivers to Plumbing Contractor for installation.

2. Food Service Equipment Contractor supplies cord and plug set for steamer, labels and delivers to Electrical Contractor for installation.

ACCESSORIES:

1. 34" High Stainless Steel Economy Stand for one (1) unit.

2. Single Point Water Connection.

3. Six (6) Vollrath #3002-3 12” x 20” x 2½” deep stainless steel perforated steam table pans.

4. 5 ft. FDA Approved National Hose Thread Style Water Connection Kit.

5. Provide NEMA 15-50P cord and plug set, 4 ft. long.

ITEM 12 TILTING BRAISING PAN, 30 GAL. Quantity: 1

MANUFACTURER: Blodgett

MODEL: 30E-BLT

ELECTRICAL: 208/60/3
NEMA 15-50P

SIZE: 30 gallon

SPECIAL DESCRIPTION:

1. Item 60 Floor Trough must be located 12" under pan in order for contents to hit drain. See drawings. Verify with pour path of unit.

2. Food Service Equipment Contractor supplies water quick disconnect for braising pan, labels and delivers to Plumbing Contractor for installation.

3. Spray assembly (See Accessory 3) to be mounted on left side of braising pan.

4. Food Service Equipment Contractor supplies cord and plug set for braising pan, labels and delivers to Electrical Contractor for installation.

ACCESSORIES:

1. 2” Tangent Draw-Off Valve.

2. Strainer for Tangent Draw-Off Valve.

3. Supply and install T & S Brass and Bronze Works:

   a. Model B-0205-LN (w/o nozzle); single pantry (cold).

   b. Model B-1410 hose and quick connect head with 5’-0” of hose. Substitute B-0044-V9 hose with backflow preventer (B-0970-FE) designed for continuous pressure use in lieu of standard stainless steel hose.

   c. Model B-1424 quick connect hook nozzle.

d. Necessary adapter for B-1410 to be joined to B-205 w/o nozzle (34A).

e. 10" Riser extension for B-0205-LN to fit a bracket on braising pan and to extend to sufficient height (verify).

f. B-1424 and quick connect spray head are interchangeable without the use of tools. Provide necessary adapter for B-0205-LN.

g. B-166 dummy wall hook. Wall hook is attached to the braising pan on left side with stainless steel screws in accessible location. (Verify location).

h. F.S.E.C. to mount spray assembly to Braising Pan, ready for final connection by Plumbing Contractor.

4. One (1) Dormont Model No. W50BP2QC ½" water connector (cold) with quick disconnect, 60" long.

5. Provide NEMA 15-50P cord and plug set, 4 ft. long.

ITEM 13 COMBI OVEN-STEAMER Quantity: 1

MANUFACTURER: Cleveland

MODEL: OEB 10.20

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. Combi Oven-Steamer is full size.

2. Food Service Equipment Contractor supplies, labels and delivers back-flow prevention devices as required by Public Health Department to Plumbing Contractor for installation into water supply lines to oven (2 total).

3. Plumbing Contractor to supply and install water pressure regulating valve, if required.

4. Food Service Equipment Contractor supplies water quick disconnects for oven, labels and delivers to Plumbing Contractor for installation.

5. Mount Water Filtration System (See Accessory 6) on wall behind Combi Oven-Steamer.

ACCESSORIES:

1. CONVOClean hands free automatic compartment washing system.

2. #CST200B Equipment Stand.

3. CONVOClean compartment cleaning solution (1 case).

4. CONVOCare compartment rinse cycle solution (1 case).

5. DISSOLVE generator descaling solution.

6. Everpure #EV9797-21 Kleensteam II Single Water Filtration System (or equal).

7. Two (2) Dormont #CMB37BP2Q Combi Oven Connectors with quick disconnect, 60” long.

8. One (1) pair Kool-Tek #KT0118K Puppet Mitts with Kevlar, 18” long, as manufactured by San Jamar.

ITEM 14 CONVECTION OVEN Quantity: 1

MANUFACTURER: Blodgett

MODEL: Mark V-100 Double

ELECTRICAL: 208/60/3
NEMA 15-50P

SIZE: Double stack. Each oven is full size.

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies two (2) cord and plug sets for ovens, labels and delivers to Electrical Contractor for installation.

STANDARD FEATURES:

1. Stainless steel front, top and sides.

2. Solid state thermostat with temperature control range of 200º - 500ºF.

3. Dual pane thermal glass windows.

4. Five (5) chrome-plated oven racks.

5. Two speed 1/2 horsepower fan motor.

6. Double-sided porcelainized baking compartment liner with coved corners.

7. 6” adjustable stainless steel legs.

8. Three (3) year parts and two (2) year labor warranty.

ACCESSORIES:

1. #SSI-M Solid State Infinite Control with manual timer.

2. Provide two (2) NEMA 15-50P cord and plug sets, 4 ft. long (one per oven).

ITEM 15 — 12-GAL. TILTING KETTLE — Quantity: 1

MANUFACTURER: Cleveland

MODEL: KET-12-T

ELECTRICAL: 208/60/3
NEMA 15-50P

SIZE: 12 gallon

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies water quick disconnect for kettle, labels and delivers to Plumbing Contractor for installation.

2. Food Service Equipment Contractor supplies cord and plug set for kettle, labels and delivers to Electrical Contractor for installation.

ACCESSORIES:

1. #CL Lift Off Cover.

2. #FBKT Faucet Mounting Bracket.

3. #SPK Water Faucet with swing spout (cold).

4. #KM Kettle Markings.

5. One (1) Carlisle #41502 Kettle Kare Kit.

6. One (1) Dormont Model No. W50BP2QC ½” water connector (cold) with quick disconnect, 60” long.

7. Provide NEMA 15-50P cord and plug set, 4 ft. long.

ITEM 16 — KETTLE STAND — Quantity: 1

MANUFACTURER: Cleveland

MODEL: ST-28 for Item 15

SPECIAL DESCRIPTION:

1. Seal kettle to stand with clear silicon caulking. See Installation Instructions this Section.

ACCESSORIES:

1. Provide and install clear plastic drain tubing of sufficient length to reach floor sink. Tubing to be rated for temperature of 212˚F. Food Service Equipment Contractor to fasten tubing to floor sink and shorten tubing to prevent kinking.

ITEM 17 INDUCTION RANGE, 4 BURNER Quantity: 1

MANUFACTURER: CookTek

MODEL: MC17004-200

ELECTRICAL: 208/60/3

STANDARD FEATURES:

1. Countertop heavy duty induction range with high-impact thick glass-ceramic top.

2. Each burner has its own separate control with ten power cook settings.

3. Two rear burners (hobs) are 5,000 watts each; two front burners (hobs) are 3,500 watts each.

4. Automatic pan detection.

5. Internal grease filter and variable speed fan ensure clean air intake and keep internal electronics cool.

6. Automatic shut-off feature prohibits overheating.

ACCESSORIES:

1. One (1) Vollrath #47721 12-Qt. Stainless Steel Stock Pot with #47773 Cover; one (1) Vollrath #47743 7-Qt. Stainless Steel Sauce Pan. Note: Cookware to be compatible with induction cooktop range.

ITEM 18 EQUIPMENT STAND Quantity: 1

MANUFACTURER: Advance Tabco

MODEL: ES-302 Modified

SIZE: 24" long x 30" wide x 20" high

SPECIAL DESCRIPTION:

1. Stand to accommodate Item 17 Induction Range.

2. Stand to be cut down to 20" working height in order for cooking surface of induction range to be approx. 35" AFF.

ITEM 19 — 36" GRIDDLE WITH STAND — Quantity: 1

MANUFACTURER: Garland

MODEL: E-24-36G

ELECTRICAL: 208/60/3
NEMA 15-50P

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies cord and plug set for kettle, labels and delivers to Electrical Contractor for installation.

ACCESSORIES:

1. One (1) #SS-CS24-36 Equipment Stand with casters.

2. Provide NEMA 15-50P cord and plug set, 4 ft. long.

ITEM 20 — MOBILE WORK TABLE, 30" X 60" — Quantity: 1

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 5'-0" long x 30" wide x 34" high

FINISH: Stainless steel

SPECIAL DESCRIPTION:

1. See General Requirements.

2. Tente swivel casters with brakes 5" H.D.

3. Edges - Bull nose.

ITEM 21 MOBILE WORK TABLE, 30" X 72" Quantity: 3

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 6'-0" long x 30" wide x 34" high

FINISH: Stainless steel

SPECIAL DESCRIPTION:

1. See General Requirements.
2. One (1) single drawer, located in center. See drawing. Pan size is 20" x 20" x 5". Drawer is attached to top. Table underbracing is not exposed.
3. Sectional removable undershelf. Sections to be sized for sending through Dish Machine.
4. Tente swivel casters with brakes - 5" H.D.
5. Edges - Bull nose.

ITEM 22 MOBILE WORK TABLE, 30" X 84" Quantity: 2

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 7'-0" long x 30" wide x 34" high

FINISH: Stainless steel

SPECIAL DESCRIPTION:

1. See General Requirements.
2. Two (2) single drawers, located on same side. See drawing. Pan size is 20" x 20" x 5". Drawer is attached to top. Table underbracing is not exposed.
3. Sectional removable undershelf. Sections to be sized for sending through Dish Machine.
4. Tente swivel casters with brakes - 5" H.D.
5. Edges - Bull nose.

ITEM 23 CONVEYOR TOASTER Quantity: 1

MANUFACTURER: Hatco

MODEL: TRH-60

ELECTRICAL: 208/60/1
NEMA 6-20P

STANDARD FEATURES:

1. Toasts bread or buns.
2. Capacity of 10 slices/minute or 600 slices/hr.
3. Has speed control, manual advance and power saving thermostat for non-peak times.
4. Includes heated toast storage area.
5. Stainless steel construction.
6. Cord and plug.

ITEM 23A EQUIPMENT STAND Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: SS-303 Modified

SIZE: 3'-0" long x 30" wide x 34" high

SPECIAL DESCRIPTION:

1. Table to accommodate Item 23 Conveyor Toaster.
2. Table to have flat top with stationary undershelf.
3. Table to be cut down to 34" working height.

ITEM 24 UTILITY CART Quantity: 2

MANUFACTURER: Lakeside

MODEL: 243

SIZE: 21” x 33” (shelf size)

STANDARD FEATURES:

1. Two (2) shelves.

2. All stainless steel construction.

3. Medium duty – 500 lb. capacity.

4. All swivel 5” casters with non-marking wheels.

ITEM 25 ICE MACHINE Quantity: 1

MANUFACTURER: Hoshizaki

MODEL: KM-515MAH

ELECTRICAL: 115/60/1
NEMA 5-20P

FINISH: Stainless steel

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies cord and plug set for ice machine, labels and delivers to Electrical Contractor for installation.

2. Provide start-up and adjustment by authorized service agency.

STANDARD FEATURES:

1. Energy Star certified.

2. Up to 527 lbs. of ice production per 24 hours.

3. R-404A refrigerant.

4. Individual crescent cube.

5. Three (3) year warranty for parts and labor on entire machine.

6. Five (5) year warranty for parts and labor on evaporator.

7. Five (5) year non-prorated warranty for parts on compressor and condenser.

ACCESSORIES:

1. #B500SF Ice Storage Bin, stainless steel finish.

2. #HS-2033 Top Kit (verify).

3. Provide NEMA 5-20P cord and plug set, 4 ft. long.

ITEM 26 WATER FILTER Quantity: 1

MANUFACTURER: Everpure

MODEL: Insurice Single – EV9324-01

SPECIAL DESCRIPTION:

1. Label and deliver to Plumbing Contractor for installation.

2. From filter, water line must be dedicated.

3. Mount to allow 3" clearance below filter.

ACCESSORIES:

1. Supply two (2) extra #EV9612-22 replacement cartridges.

ITEM 27 60 QUART MIXER Quantity: N.I.C. - 1 Existing

MANUFACTURER: Hobart Corporation

MODEL: H600
S/N 11-047-400; ML 17395

ELECTRICAL: 208/60/3
NEMA 15-20P (Verify)

SPECIAL DESCRIPTION:

1. Authorized Hobart Service Agency to install new bowl guard for Mixer and replace broken knob. Furnish and install new cord and plug set.

2. Mixer to be refinished to match original paint.

3. Authorized Hobart Service Agency to provide Level One Preventative Maintenance for Mixer.

4. Food Service Equipment Contractor to pick up equipment at end of school year and deliver to Authorized Hobart Service Agency. Mixer to be serviced, then stored at their facility until job site is ready for delivery of equipment.

5. Food Service Equipment Contractor to show rough-in for Mixer on his electrical connection plan.

ACCESSORIES:

1. Mixer Bowl Guard Add-On Kit (for 60-Qt. Mixer). Deliver to Authorized

Hobart Service Agency for installation.

2. One (1) 60-Qt. Bowl Truck.

3. One (1) Ingredient Chute.

4. One (1) Hobart Model No. VS9 Vegetable Slicer with adjustable slice plate, plate holder assembly, grater plate, 3/32" shredder plate and 5/16" shredder plate.

ITEM 28 MIXER ACCESSORY RACK Quantity: 1

MANUFACTURER: InterMetro Industries Corporation

MODEL: Metro Super Erecta
(2) A2448NS Wire shelves, 24” x 48”
(4) 74PS Posts
(2) SF55N3C Three sided channel frame
(2) EP56C Enclosure panel
(2) L48N-4C Rear shelf ledge
(2) L24N-4C Side shelf ledge
(4) 9970Z Enclosure panel retaining clamp
(36) HK23C Hooks
1 unit

SIZE: 24” x 48”

FINISH: Stainless steel shelves and posts. Balance to be chrome.

SPECIAL DESCRIPTION:

1. Rack consists of four (4) posts and two wire shelves with the bottom shelf installed 58” AFF. Top shelf to finish 4” from top of posts. Install three sided channel frame approximately 30” AFF to brace unit. Install enclosure panels on both ends from top shelf. Both shelves to have rear shelf ledges. Top shelf to have side shelf ledges. Top of posts to have endcaps. Mount snap-on hooks to enclosure panels.

ITEM 29 20 QUART MIXER Quantity: 1

MANUFACTURER: Hobart Corporation

MODEL: HL200

ELECTRICAL: 120/60/1
NEMA 5-15P

ACCESSORIES:

1. Standard Accessory Package including 20 qt. stainless steel bowl, “B” flat beater and “D” wire whip.

2. One (1) Ingredient Chute.

ITEM 30 MOBILE MIXER STAND Quantity: 1

MANUFACTURER: Advance Tabco

MODEL: MT-SS-302

STANDARD FEATURES:

1. 14 gauge stainless steel top with 2" x 1" square die embossed NO DRIP edge.

2. 18 gauge stainless steel undershelf.

ACCESSORIES:

1. #TA-255 Super Heavy Duty Polyurethane Casters.

ITEM 31 MOBILE HOT FOOD CABINET Quantity: 1

MANUFACTURER: Winston

MODEL: HL4522

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. “Controlled Vapor Technology" matches water vapor content of food.

2. Electronic differential controls, including food temp and food texture dials.

3. Fully insulated cabinet.

4. Adjustable and removable wire rack supports accommodate (28) 12” x 20” steam table pans and (14) 18” x 26” bun pans.

5. Stainless steel all welded construction.

6. Door with field reversible hinging. Furnish as per plan.

ACCESSORIES:

1. Bumper Guard: Full perimeter bumpers with 5" casters (2 locking, 2 non-locking) Note: Casters to be swivel casters.

2. Window: Window in doors.

ITEM 32 2-SECTION PASS-THRU REFRIGERATOR Quantity: 1

MANUFACTURER: Traulsen

MODEL: AHT232WPUT-HHS

ELECTRICAL: 120/60/1
NEMA 5-15P

FINISH: Stainless Steel Exterior/Anodized Aluminum Interior

SPECIAL DESCRIPTION:

1. Front edge of Item 32 to rest on curb. Remove legs on customer side and adjust legs at rear to level. See Section C on Sht. FS1.10 Main Kitchen Waste & Special Conditions Plan.

STANDARD FEATURES:

1. INTELA-TRAUL® Microprocessor Control System.

2. Automatic non-electric condensate evaporator.

3. 6” high adjustable stainless steel legs.

4. Doors with locks.

5. 9’ cord and plug attached.

ACCESSORIES:

1. Universal tray slides on 5" centers (20 pairs total).

2. Provide and install 22 gauge, Type 304, 18-8 stainless steel trim on customer and operator sides to seal unit to wall. Trim is attached to wall and unit with stainless steel fasteners and sealed to box and walls with clear silicon caulking. Use clear silicon caulking described in this section under Installation. Purpose of trim and caulking is to provide a complete seal between the wall and the box and to close crevices against dirt and vermin.

ITEM 33 2-SECTION PASS-THRU HOT CABINET Quantity: 1

MANUFACTURER: Traulsen

MODEL: AHF232WP-HHS

ELECTRICAL: 115/208/60/1
NEMA L14-20P

FINISH: Stainless Steel Exterior/Anodized Aluminum Interior

SPECIAL DESCRIPTION:

1. Front edge of Item 33 to rest on curb. Remove legs on customer side and adjust legs at rear to level. See Section C on Sht. FS1.10 Main Kitchen Waste & Special Conditions Plan.

STANDARD FEATURES:

1. INTELA-TRAUL® Microprocessor Control System.

2. 6” high adjustable stainless steel legs.

3. Doors with locks.

ACCESSORIES:

1. Universal tray slides on 5" centers (20 pairs total).

2. Provide NEMA L14-20P cord and plug set, 4 ft. long.

3. Provide and install 22 gauge, Type 304, 18-8 stainless steel trim on customer and operator sides to seal unit to wall. Trim is attached to wall and unit with stainless steel fasteners and sealed to box and walls with clear silicon caulking. Use clear silicon caulking described in this section under Installation. Purpose of trim and caulking is to provide a complete seal between the wall and the box and to close crevices against dirt and vermin.

ITEM 34 SINK HEATER Quantity: 1

MANUFACTURER: Hatco

MODEL: 3CS-9B

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. Install in Item #36 3-Compartment Sink as shown on drawing.

2. Food Service Equipment Contractor to supply and install ¾” flexible hose from unit to floor sink.

3. Unit is balanced three phase.

ACCESSORIES:

1. All stainless steel body and base.

2. Temperature light.

ITEM 35 HANDWASH SINK Quantity: N.I.C.- 5 By Other Trades

Supplied and installed by Plumbing Contractor. See drawings for locations. Food Service Equipment Contractor to provide splash shields for sinks as required by Health Department.

ITEM 36 3-COMPARTMENT SINK Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: 94-83-60-24RL

SIZE: 115" Overall Length
Drainboard Length - 24"

SPECIAL DESCRIPTION:

1. Sink to be 14 gauge, type 304 stainless steel construction.

2. Sink to be attached to wall at rear turn-up. Attach sink with stainless steel drive-in studs.

STANDARD FEATURES:

1. Stainless steel gussets and channels, type 304 stainless steel legs and stainless steel 1” adjustable feet.

2. Adjustable front and rear crossbracing.

3. Compartment size is 20” x 28” x 14” deep.

4. NSF approved installation. Meets NSF requirement that drain boards are equipped with a backsplash and are integrally welded to the sink.

ACCESSORIES:

1. Provide one (1) T & S Brass and Bronze Works Model B-0265 Faucet with 18” double swing joint nozzle and B-0230-K Installation Kit.

2. Provide three (3) #K-5 Twist Handle Drains with three (3) #K-4 Support Brackets.

3. Provide #K-491 Provision for Hatco Sink Heater in left sink compartment.

ITEM 37 WALL-MOUNTED SHELVING, 14" x 42" Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Erecta Shelf®
(4) 1442NK3 Wire Shelves
(8) 1WD14K3 Direct Wall Mount Shelf Supports
4 units

SIZE: 14” x 42”

FINISH: Metroseal 3 shelves and supports

SPECIAL DESCRIPTION:

1. Install shelves over Item 36 3-Compartment Sink at 54" AFF and 66" AFF.

ITEM 38 DISH MACHINE W/BUILT-IN BOOSTER HEATER Quantity: 1

MANUFACTURER: Hobart Corporation

MODEL: CL44e (L-R)

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. Single point electrical connection (not including booster heater).
2. 15 K.W. electric tank heat.
3. Vent fan and booster heater control.
4. Common drain connection on unload end.
5. Energy Star certified.
6. Water hammer arrestor to be supplied and installed by Plumbing Contractor in hot water supply line at service connection.

ACCESSORIES:

1. 30 K.W. electric booster heater.
2. Higher than standard chamber.
3. Two (2) stainless steel vent hoods with vent stack and locking-type damper;

anti-condensate drip pan on the unload end.

4. Two (2) Vent hood curtain kits.

5. Dish Racks
(6) Hobart DISHRAK-PEG20 Peg Racks
(4) Hobart DISHRAK-COM20 Combination Racks
(2) Hobart SHTPAN-RACK to transport (6) 18" X 26" bun pans through machine.

6. Furnish and install a pant leg duct made from 16 gauge, type 304, 18-8 stainless steel, all welded and polished to a smooth finish. Duct shall be welded as one piece. The pant leg duct is to extend through the ceiling plus 6" to 12" beyond it depending upon type of ceiling (verify). Stainless steel trim is to be provided at the ceiling. Duct is to be fabricated to the standards of Kalthoff Fabricators, Knoxville, TN.

ITEM 39 TROUGH COLLECTOR Quantity: 1

MANUFACTURER: Salvajor

MODEL: S419 (L-R)

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. Left to right operation. See drawing.

2. MSS-LD control to be mounted on left.

3. Collector top, gusher head and trough diffuser to be shipped to Fabricator for installation into Soiled Dish Table (Item #40).

4. Plumbing Contractor to provide recirculating plumbing between unit and trough gusher head and water inlets.

5. Hot and cold water supply required.

ACCESSORIES:

1. Additional scrap basket.

2. One (1) #988001 Gusher Head Assembly.

3. One (1) #980061 Trough Diffuser.

4. One (1) #419CISS Full Stainless Steel Cover.

ITEM 40 SOILED DISH TABLE WITH CONVEYOR Quantity: 1 LOT

MANUFACTURER: Aerowerks

MODEL: SBC-10/Custom

SIZE: Size and shape as shown on the drawing.

ELECTRICAL: 208/60/1

SPECIAL DESCRIPTION:

1. See General Requirements.

2. All stainless steel.

3. Table to be fabricated to fit Hobart #CL44e Dish Machine at load end. Soiled dish table to be integrated with conveyor. Conveyor is designed to deliver soiled dishware from tray return window to scrapping table in dishroom.

4. Provide double-wall insulated plastic laminated panels at tray return window. Panels to extend to floor. Panels to be fitted to conveyor support structure and be equipped with a kick plate. Panels and kick plate shall be removable, lift-off design.

5. Conveyor shall be Aerowerks Model SBC-10 single slat belt dishware return conveyor.

6. Belting to consist of Aerowerks Model K10SF-AD with a tensile strength of 6,100 lbs. and shall "side-flex" to a minimum of 19" centerline radius at corners where required. There shall be no sliding friction at corners between belt and groove or guide rail. Both slide bed groove and return track shall be self-cleaning by the action of the belt. Belt take-up shall be accomplished by the natural catenary sag of the belt in the wash chamber.

7. Drive frame shall be all-welded stainless steel angle with 1-5/8”Ø 6” high stainless steel legs and adjustable stainless steel bullet feet.

8. Drive frame shall be fitted with an 18 ga. stainless steel housing on all sides. For access provide stainless steel double wall hinged insulated doors. Where side or end panels are fitted to frame, they shall be sealed with silicone. Drive cabinet to house all necessary plumbing and detergent injection pump for the belt wash system.

9. Provide all welded 14 ga stainless steel wash chamber equipped with lift-off access panels and removable scrap tray.

10. Provide 1” stainless steel drive shaft mounted within wash chamber on dual-type sealed bearings (Aerowerks grease-filled sealed cartridge inside

chamber; precision ball bearing flange cartridge outside chamber).

11. Provide belt wash system consisting of stainless steel manifolds inside wash chamber. Spray manifolds shall be located to effectively clean the belt on both sides, and shall be easily removable without tools.

12. Provide variable speed ¾ hp AC Motor and gear reducer. Speed to be changed by turning a knob located on the control panel.

13. Slide bed to be 14 ga. type 304 stainless steel and formed with vertical and horizontal corners coved to a ¾" radius. Unit shall be reinforced with channel mounted on 1 5/8"Ø tubular stainless steel legs with adjustable bullet feet and rails

14. Soiled dish table to be 14 ga. type 304 stainless steel and formed with vertical and horizontal corners coved to a ¾" radius. Table to have 2½" high flat rim edge on operator side with 9" high backsplash at rear and where dish table abuts wall. Seal to wall with clear silicon caulking that will withstand 400ºF. See General Requirements, Section 11.40.00 for type of sealant to use.

15. Ends of backsplash are completely enclosed, integrally welded, finished and polished and fully sealed to table top to meet NSF standards.

16. Soiled dish table to have waste trough with magnetic silver saver and two (2) perforated ledges. Trough shall be 9" wide, sloping from 3" to maximum with matching flange at end-mounted Salvajor Trough Collector (Item 39). Furnish trough with connection for trough gusher for recirculating water line. Plumbing Contractor to furnish and install recirculating water line mounted under dish table from end of trough to waste collector.

17. Food Service Equipment Contractor to provide one (1) Salvajor gusher head (side nozzle) and one (1) trough diffuser (end nozzle) to mount into trough.

18. Food Service Equipment Contractor to ship collector top to fabricator for welding into soiled dish table.

19. Soiled dish table to be supported on 1 5/8"Ø stainless steel legs with adjustable bullet feet. Legs shall be supported with 12 ga. stainless steel channels. Crossrails must be supplied between each leg vertically and horizontally. Omit crossrails where they conflict with equipment or equipment connections under the tables. Move crossrails to front when they interfere with plumbing connections in rear.

20. Table top is to be sound deadened with sound deadening pads as described in the General Fabrication specifications.

21. Provide UL Listed Main Control Center containing main disconnect, start-

stop, speed control, and indicating lights. All components shall be neatly contained in a stainless steel watertight enclosure. All wiring shall conform to the latest UL standards. The electrical contractor shall bring 208V/1phase/15A to the main of the panel, but wiring from the equipment to this panel shall be done by Aerowerks, and all wiring shall be carried in liquid tight conduits, including conveyor motor and controls. All electrical controls shall be approved for wet conditions and shall comply with all applicable codes. All enclosures for electrical components must be watertight.

22. Aerowerks shall be responsible for all interconnections of Electrical work required for conveyor system. Final connections to building services shall be by others. Aerowerks shall install and adjust system to owner's satisfaction and shall provide adequate instructions to operating personnel. System shall be guaranteed for a period of one year for parts and labor under normal operating Plumbing interconnections shall be by others.

23. Laminated panel color to be selected by Architect.

ITEM 41 MOP SINK Quantity: 1 By Other Trades

Floor mounted mop sink is equipped with hose and hanger and hot and cold mixing faucet and is supplied and installed by Plumbing Contractor. Faucet must be equipped with a back-flow prevention device. F.S.E.C. to show plumbing and waste requirements for Mop Sink on his plans.

ITEM 42 HIGH PRESSURE CLEANING SYSTEM Quantity: 2

MANUFACTURER: Spray Master Technologies

MODEL: SMT-600-WDF (Food Service Package)

ELECTRICAL: 120/60/1
NEMA 5-20P

SPECIAL DESCRIPTION:

1. Systems to be located on wall where shown on plan. See detail on Sht. FS112.

2. Provide standard 600-W unit with 2 H.P. motor, 2.2 GPM @1,100 P.S.I. (115 volts), adjustable chemical and sanitizer injector with flush feature, 50' Hi-Pressure steel braided hose, 36" spray gun/wand assembly, wall-mount brackets with gun hanger, two (2) chemical baskets and 200-RW manual rewind hose reel.

3. Provide 75' Hi-Pressure hose upgrade (per unit).

4. Food Service Package to include the following:

a. Maintenance Kit: Water filter assembly with one 5 micron filter, 6' supply hose, replacement filter and hydraulic pump oil.

b. Trap shooter spray gun with flexible wand and 10' hose.

c. Hummer Jet, Jr. attachment.

d. Wall and Tile Brush.

5. System to have anti-backflow protection.

ACCESSORIES:

1. Four (4 total) Carlisle #41567 Sparta Spectrum 18" plastic squeegees with #40225 60" Spectrum Fiberglass Flex-Tip handles. Color to be white.

ITEM 43 RACK SHELF Quantity: 1

MANUFACTURER: Aerowerks

MODEL: Custom

SIZE: Size and shape as shown on the drawing.

SPECIAL DESCRIPTION:

1. Rack shelf to be integral part of Item 40 Soiled Dish Table with Conveyor.

2. Provide vertically adjustable 2-tier overhead rack/storage shelves as shown on plan. Shelves to be cantilever style mounted on 1"Ø stainless steel tubular supports extending through backsplash. Rack shelf to be adjustable from 47" - 53" AFF and hold four (4) 20" x 20" dish racks. Storage shelf to be adjustable from 55" - 61" AFF.

ITEM 44 CLEAN DISH TABLE Quantity: 1

MANUFACTURER: Aerowerks

MODEL: GRC

SIZE: Size and shape as shown on the drawing.

SPECIAL DESCRIPTION:

1. See General Requirements.

2. All stainless steel.

3. Clean dish table to be gravity roller conveyor table, size and shape as

shown on drawings. Table to be 14 ga. stainless steel with vertical and horizontal corners coved to a ¾" radius. Table to be equipped with turned up sides with hemmed edges. Hemmed edges to extend approx. 2" above top of rollers. Table to be connected to exit end of Item 62 Dish Machine Unloader to provide a drip-proof connection. Table to be sloped to drain built into table.

4. Clean dish table shall be designed to accept a gravity roller conveyor to carry dish racks from dish machine smoothly and aid in drying of racks. Rollers shall be 1.9" diameter blue PVC, fitted with polypropylene bearings with stainless steel balls. Rollers shall be spaced approx. 5.5" O.C. Shafts shall be 7/16" hexagon aluminum securely bolted to side rails. Side rails shall be 1/8" x 2" stainless steel resting on support pins welded to side of conveyor bed to keep rollers elevated above bottom of conveyor bed for effective draining of water from dish racks.

5. Clean dish table to be supported on 1-5/8" Ø stainless steel legs with adjustable flange feet. Crossrails must be supplied between each leg vertically and horizontally.

6. Provide a pre-wired accumulation switch at end of clean dish table. Electrical Contractor to wire switch back to dish machine to shut machine off when rack reaches end of table.

7. Table top is to be sound deadened with sound deadening pads as described in the General Fabrication specifications.

8. Table will not be sealed to wall. (Note: Minimum 6-5/8" space required at rear between table and wall so dish racks with sheet pans can clear 90º turn.)

<u>ITEM 45</u> <u>REFRIGERATED SELF-SERVICE CASE</u> <u>Quantity: 1</u>

MANUFACTURER: Structural Concepts

MODEL: CO67R

ELECTRICAL: 208/60/1
NEMA 6-20P

STANDARD FEATURES:

1. Breeze-E (Type II) energy efficient, self-contained refrigeration system with front air intake and rear discharge.

2. Laminated exterior. Color to be selected by Architect.

3. Full end panels with mirror interior.

4. Adjustable and removable metal shelves.

5. Four (4) casters.

6. Top lights (T-8 fluorescent).

7. 6 ft. power cord.

ACCESSORIES:

1. Rear loading hinged doors, locking.

2. Metal shelves, lighted (LED).

3. Night curtain, retractable, non-locking.

ITEM 46 SOLID TOP UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 96-ST

SIZE: 96-3/8" long x 30" wide x 34" high

ELECTRICAL: 120/60/1
NEMA 5-20P

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Unit to have one (1) Solid “V” Ridge Tray Slide, size and shape as shown on plan. Tray slide to be mounted 1” below countertop or 33” AFF.

4. Provide convenience outlet (115/60/1, 20 amp) mounted underneath top. Wire to cord and plug. Locate cord and plug on end adjacent to wall.

5. Provide 3" dia. ferruled opening in top for cord and plug access.

6. Stainless Steel Legs.

7. Color to be selected by Architect.

ITEM 47 HEATED SHELF UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 36-ST-EB/GHT-28

SIZE: 36-3/8" long x 30" wide x 34" high

ELECTRICAL: 120/60/1
NEMA 5-15P

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Provide cut-out in countertop for Drop-In Glass Heated Shelf.

4. Provide Buffet Shield, Single Service, with lift-up hinge. Shield to include heat lamp strip with lights wired to on/off switch in base.

5. Unit to have one (1) Solid “V” Ridge Tray Slide, size and shape as shown on plan. Tray slide to be mounted 1” below countertop or 33” AFF.

6. Provide Cam Operated Line-Up Locks.

7. Stainless Steel Legs.

8. Unit to be daisy chained to receptacle on Item 51 Solid Top Unit.

9. Color to be selected by Architect.

ITEM 48 4-WELL HOT FOOD UNIT Quantity: 2

MANUFACTURER: Colorpoint

MODEL: EF4-CPA

SIZE 60-3/8” long x 30” wide x 34” high

ELECTRICAL: 120/208/60/1
NEMA 14-20P Plug

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line). Note: Standard drain valve configuration acceptable for this unit.

2. 34” counter top height.

3. Water Fill Faucet (hot water). Locate on left (operator side).

4. Provide Adjustable "G" Sloped Front Protector with adjustable sneeze guard.

5. Protector to have incandescent lights.

6. Unit to have one (1) Solid “V” Ridge Tray Slide on customer side. Tray slide to be mounted 1” below countertop or 33” AFF.

7. Provide Cam Operated Line-up Locks.

8. 8" Wide Stainless Steel Cutting Board.

9. Provide Individual Hot Food Well Drains manifolded to single drain valve.

10. Entire unit is interwired with one cord and plug. Hot food unit at K-5 serving line to be daisy chained to Item 52 Cold Food Unit; hot food unit at main serving line to be daisy chained to Item 51 Solid Top Unit.

11. Stainless Steel Legs.

12. Color to be selected by Architect.

ACCESSORIES:

1. Provide and install 22 gauge, Type 304, 18-8 stainless steel trim on customer side to seal unit to floor and wall (K-5 line only). Trim is attached to floor with stainless steel fasteners and sealed to body of unit and wall with clear silicon caulking. Use clear silicon caulking described in this section under Installation. Purpose of trim and caulking is to provide a complete seal between the floor, wall and the unit and to close crevices against dirt and vermin. See Sht. FS1.14 Equipment Details, Section thru Floor @ K-5 Serving Line.

ITEM 49 BEVERAGE COUNTER Quantity: 2

MANUFACTURER: Colorpoint

MODEL: 74-ST-EB

SIZE: 74-3/8" long x 30" wide x 34" high

ELECTRICAL: 120/60/1
NEMA 5-20P

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Unit to have one (1) Solid “V” Ridge Tray Slide, size and shape as shown on plan. Tray slide to be mounted 1” below countertop or 33” AFF.

4. Provide Cam Operated Line-up Locks.

5. Provide hinged doors on side with tray slide.

6. Provide convenience outlet (115/60/1, 20 amp) mounted underneath top. Wire to cord and plug.

7. Provide 3" dia. ferruled opening in top for cord and plug, water and drain access.

8. Provide knock-out in bottom of unit for water and drain access.

9. Stainless Steel Legs.

10. Color to be selected by Architect.

ITEM 49A CUP DISPENSER Quantity: 2

MANUFACTURER: San Jamar

MODEL: C2703

STANDARD FEATURES:

1. 3 Cup Dispenser.

2. Stainless steel cabinet.

3. EZ-Fit dispensers with (4) pre-cut gaskets that accommodate 6-24 oz. beverage cups.

4. NSF approved.

ITEM 49B ICE AND WATER DISPENSER Quantity: 1

MANUFACTURER: Servend

MODEL: S-150

ELECTRICAL: 120/60/1
NEMA 5-15P

SPECIAL DESCRIPTION:

1. Unit to plug into receptacle on Item 49 Beverage Counter.

2. Water filler to be connected to filtered water.

STANDARD FEATURES:

1. 150 lb. ice storage capacity.

2. Manual fill.

3. Lighted front panel with ice graphics.

4. Leg and drain kit.

ACCESSORIES:

1. Flomatic water valve.

2. Everpure Model No. QL2-OCS² (Part #EV9275-60) Water Filter with two (2) OCS² (Part #EV9618-02) Replacement Cartridges. Filter to be mounted inside Item 49 Beverage Counter hinged door compartment.

ITEM 49C BEVERAGE DISPENSER Quantity: 2

MANUFACTURER: Cambro

MODEL: 500LCD

SPECIAL DESCRIPTION:

1. Color to be selected by Architect.

STANDARD FEATURES:

1. Single molded, seamless, double wall, high density insulated polyethylene construction is highly durable and dishwasher safe.

2. 4¾ gallon capacity.

3. Molded-in handles.

4. Drip proof recessed spigot.

5. NSF approved.

ACCESSORIES:

1. One (1) #R500LCD Riser (per unit).

2. One (1) #LCDCH Condiment Holder (per unit).

ITEM 49D COFFEE BREWER Quantity: 1

MANUFACTURER: Bunn-O-Matic

MODEL: CWTF-15-3 (#12950.0212)

ELECTRICAL: 120/60/1
NEMA 5-15P

SPECIAL DESCRIPTION:

1. Unit to plug into receptacle on Item 49 Beverage Counter.

2. Coffee Brewer to be connected to filtered water.

STANDARD FEATURES:

1. 12 cup automatic brewer with three (3) lower warmers.

2. Brews 3.9 to 7.5 gallons per hour.

3. All stainless steel construction.

4. Hot water faucet.

ACCESSORIES:

1. Two (2) Easy Pour® Black Decanters.

2. One (1) Easy Pour® Orange Decanter (decaf).

3. Everpure Model No. QL2-OCS² (Part #EV9275-60) Water Filter with two (2) OCS² (Part #EV9618-02) Replacement Cartridges. Filter to be mounted inside Item 49 Beverage Counter hinged door compartment.

ITEM 50 COLD FOOD UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 66-CFT Modified

SIZE: 66-3/8” long x 30” wide x 34” high

ELECTRICAL: 120/60/1
NEMA 5-15P

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line). Note: Standard drain valve configuration acceptable for this unit.

2. 34” counter top height.

3. Top to have 1” deep refrigerated recess for three (3) 18” x 26” pans (in lieu of frost top with removable grate).

4. Provide Refrigerated Over Shelf, 2-tier, with fluorescent lights. Shelf to accommodate two (2) 18" x 26" sheet pans placed horizontally.

5. Unit to have one (1) Solid “V” Ridge Tray Slide on customer side. Tray slide to be mounted 1” below countertop or 33” AFF.

6. Provide Cam Operated Line-up Locks.

7. Entire unit is interwired with one cord and plug. Unit to be daisy chained to Item 51 Solid Top Unit.

8. Stainless Steel Legs.

9. Color to be selected by Architect.

ITEM 51 SOLID TOP UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 50-ST-EB Modified

SIZE: 40-3/8” long x 30” wide x 34” high

ELECTRICAL: 120/208/60/1
NEMA 14-50P

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Unit to be open at rear with space to accommodate Item 101 Dish Dolly on operator side.

4. Unit to have three (3) receptacles as required to serve Items 47, 48 and 50. Entire unit is interwired with one cord and plug. Locate cord and plug on

end of unit adjacent to wall so as not to interfere with Item 101 Dish Dolly.

5. Provide access panel(s) in pylon adjacent to wall for access to electrical service. See plan.

6. Unit to have one (1) Solid “V” Ridge Tray Slide on customer side. Tray slide to be mounted 1” below countertop or 33” AFF.

7. Provide Cam Operated Line-up Locks.

8. Stainless Steel Legs.

9. Color to be selected by Architect.

ITEM 52 COLD FOOD UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 74-CFT Modified

SIZE: 74-3/8” long x 30” wide x 34” high

ELECTRICAL: 120/208/60/1
NEMA 14-30P

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line). Note: Standard drain valve configuration acceptable for this unit.

2. 34” counter top height.

3. Top to have 1” deep refrigerated recess for three (3) 18” x 26” pans (in lieu of frost top with removable grate).

4. Provide Refrigerated Over Shelf, 2-tier, with fluorescent lights. Shelf to accommodate two (2) 18" x 26" sheet pans placed horizontally.

5. Unit to have one (1) Solid “V” Ridge Tray Slide on customer side. Tray slide to be mounted 1” below countertop or 33” AFF.

6. Provide Cam Operated Line-up Locks.

7. Unit to have receptacle for Item 48 4-Well Hot Food Unit (K-5 line). Entire unit is interwired with one cord and plug.

8. Stainless Steel Legs.

9. Color to be selected by Architect.

ACCESSORIES:

1. Provide and install 22 gauge, Type 304, 18-8 stainless steel trim on customer side to seal unit to floor and wall. Trim is attached to floor with stainless steel fasteners and sealed to body of unit and wall with clear silicon caulking. Use clear silicon caulking described in this section under Installation. Purpose of trim and caulking is to provide a complete seal between the floor, wall and the unit and to close crevices against dirt and vermin. See Sht. FS1.14 Equipment Details, Section thru Floor @ K-5 Serving Line.

ITEM 53 SOLID TOP UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 96-ST

SIZE: 96-3/8” long x 30” wide x 30” high

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 30” counter top height.

3. Provide cut-out in counter top for Item 53A Water Filler. See plan for location.

4. Unit to have one (1) Solid “V” Ridge Tray Slide on customer side. Tray slide to be mounted 1” below counter top or 29” AFF.

5. Provide Cam Operated Line-up Locks. Note: Tray slide to align with tray slide on Item 52 Cold Food Unit at 90 degree angle.

6. Provide knock-out in bottom of unit for water and drain access.

7. Stainless Steel Legs.

8. Color to be selected by Architect.

ITEM 53A WATER FILLER Quantity: 1

MANUFACTURER: T & S Brass & Bronze Works

MODEL: B-1230

SPECIAL DESCRIPTION:

1. Water Filler to be located on Item 53 Solid Top Unit where shown on plan. F.S.E.C. to ship unit to serving line fabricator for installation.

2. Water Filler to be connected to filtered water.

ACCESSORIES:

1. Everpure Model No. QL2-OCS² (Part #EV9275-60) Water Filter with two (2) OCS² (Part #EV9618-02) Replacement Cartridges. Filter to be mounted inside Item 53 Solid Top Unit open storage compartment.

ITEM 54 MOBILE MILK UNIT Quantity: 1

MANUFACTURER: True Food Service Equipment

MODEL: TMC-58-S-DS-SS

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Forced air refrigeration system utilizing environmentally friendly (CFC free) 134A refrigerant.

2. All stainless steel exterior.

3. Cylinder lock.

4. Four (4) 4” dia. heavy duty swivel casters, two (2) with brakes.

5. Exterior digital temperature display.

6. Designed to hold sixteen (16) cases of milk.

ACCESSORIES:

1. Corner bumpers.

ITEM 55 SOLID TOP UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 60-ST-EB

SIZE: 60-3/8" long x 30" wide x 34" high

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Unit to have two (2) Solid “V” Ridge Tray Slides. Tray slide on K-5 side to be mounted 5" below countertop or 29" AFF; other tray slide to be mounted 1” below countertop or 33” AFF.

4. Provide Cam Operated Line-up Locks.

5. Provide hinged doors on side with 33" AFF tray slide.

6. Stainless Steel Legs.

7. Color to be selected by Architect.

ITEM 56 CASHIER UNIT Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 28-CSE

SIZE: 28-3/8” long x 30” wide x 34” high

ELECTRICAL: 120/60/1
NEMA 5-15P plug

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Locking Cash Drawer with removable money tray.

4. Provide flush-mounted convenience outlet in base of unit. Provide knock-out in top for cord and plug.

5. Provide bottom shelf approximately 12” wide.

6. Entire unit is interwired with one cord and plug. Locate cord and plug on end of unit closest to receptacle.

7. Unit to have two (2) Solid “V” Ridge Tray Slides. Tray slide on K-5 side to be mounted 5" below countertop or 29" AFF; other tray slide to be mounted 1” below countertop or 33” AFF.

8. Provide Cam Operated Line-up Locks.

9. Stainless Steel Legs.

10. Color to be selected by Architect.

11. Conduit for computer interface from Item 56 to computer location in Manager's office is required. See drawings. Under the floor conduit for interfaces to be supplied and installed by Electrical Contractor.

ITEM 56A CASHIER STOOL Quantity: 1

MANUFACTURER: Mayline

MODEL: 2660

SPECIAL DESCRIPTION:

1. Adjustable seat height.

2. Upholstery color to be selected by Architect.

ITEM 57 UTENSIL RACK Quantity: 1

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(4) A2448NK3 Wire shelves
(4) 63UPK3 Posts for stem casters
(1) EP55C Enclosure panel
(2) 9970Z Enclosure panel retaining clamp
(6) L48N-4C Rear shelf ledge
(4) L24N-4C Side shelf ledge
(1) MTR2448XE Tray drying rack
(4) 5MP Casters
(2) MTB93060W Tote Box
(2) US24NA Drawer slide set
(36) HK23C Hooks
1 unit

SIZE: 24” x 48”

FINISH: Metroseal 3 shelves and posts. Balance to be chrome.

SPECIAL DESCRIPTION:

1. Rack consists of four (4) posts with stem casters and four (4) wire shelves spaced evenly with the bottom shelf installed 6” AFF. Top shelf to finish even with posts. Install enclosure panel on left end from top shelf. Install

tray module on bottom shelf. Remaining three shelves to have front, rear and right side shelf ledges. Top shelf to have left side shelf ledge. Top of posts to have end caps. Mount tote boxes and slide sets under second shelf from top. Mount snap-on hooks to enclosure panel. Casters to have donut bumpers.

ACCESSORIES:

1. One (1) set of San Jamar #CB1824KC Kolor-Cut cutting boards. Set includes six boards, each a separate color, in a combo pack with wall chart. Size is 18” x 24” x ½” thick.

ITEM 58 CONDIMENT RACK Quantity: 1

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(4) A1842NK3 Wire shelves
(4) 63UPK3 Posts for stem casters
(4) 5MP Casters
(8) L18N-4C Side ledges
(8) L42N-4C Back ledges
1 unit

SIZE: 18” x 42”

FINISH: Metroseal 3 shelves and posts. Balance to be chrome.

SPECIAL DESCRIPTION:

1. Rack consists of four (4) posts with stem casters and four (4) wire shelves spaced evenly with the bottom shelf installed 6” AFF. Top shelf to finish 4" from top of posts. All four shelves to have front, rear, right and left side shelf ledges. Top of posts to have end caps. Casters to have donut bumpers.

ITEM 59 POT/PAN RACK Quantity: 2

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(8) A2448NK3 Wire shelves, 24” x 48”
(8) 63UPK3 Posts for stem casters
(2) TR2448XEA Tray module
(8) 5MP Casters
2 units

SIZE: 24” x 48”

FINISH: Metroseal 3 shelves and posts.

SPECIAL DESCRIPTION

1. Rack consists of four (4) posts with stem casters and four (4) wire shelves spaced evenly with the bottom shelf installed 6” AFF. Top shelf to finish even with posts. Install tray module on top shelf. Top of posts to have endcaps. Casters to have donut bumpers.

ITEM 60 FLOOR TROUGH, 24" X 24" Quantity: 1

MANUFACTURER: Eastern Steel or Approved Fabricator

FINISH: Stainless Steel

MODEL: Eastern Steel Standard Floor Trough with Subway Grating
Model FT Drain Trough
Model SFB Subway Style Grating

Approved Fabricator - Unit must be comparable to above.

SIZE: 24" x 24"

SPECIAL DESCRIPTION:

1. See detail.

2. 4" drain connection required.

3. Grating must be level with plane of finished floor.

ITEM 61 FLOOR TROUGH, 12" X 48" Quantity: 1

MANUFACTURER: Eastern Steel or Approved Fabricator

FINISH: Stainless Steel

MODEL: Eastern Steel Standard Floor Trough with Subway Grating
Model FT Drain Trough
Model SFB Subway Style Grating

Approved Fabricator - Unit must be comparable to above.

SIZE: 12" x 48"

SPECIAL DESCRIPTION:

1. See detail.

2. 4" drain connection required.

3. Grating must be level with plane of finished floor.

ITEM 62 DISH MACHINE UNLOADER Quantity: 1

MANUFACTURER: Aerowerks

MODEL: 90º Tite Turn Unloader

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. Power unloader to fit Hobart #CL44e Dish Machine at exit end and Item 44 Clean Dish Table at other end. 90° turn makes a smooth transition to the roller table.

2. Motor-powered turn track made from stainless steel with polyethylene guides for top and return side.

3. Entire drive chain assembly shall be supported inside a 14 ga. stainless steel pan.

4. Unit to be supported on 1 5/8” Ø stainless steel tubing legs with adjustable feet.

5. Provide plastic pivot-radius chain, motorized, to pull 20” x 20” dish racks around a tight radius so that overall powered curve dimension from end of dish machine to far side of table is no greater than 34”.

6. Inside radius of unloader is equipped with stub rollers to support racks on inboard side. Roller specs same as Aerowerks standard GRC (See Item 44 Clean Dish Table).

7. Unloader is equipped with an emergency stop which also stops dish machine.

8. Powered unloader is interwired to dish machine so that it is running when dish machine is operating.

ITEM 63 DISH RACK DOLLY Quantity: 4

MANUFACTURER: Cambro

MODEL: CDR2020

ITEM 64 MILK CRATE DOLLY Quantity: 2

MANUFACTURER: New Age Industrial

MODEL: 1622

SIZE: 26-3/4” x 28-1/4” x 9” high

SPECIAL DESCRIPTION:

1. Aluminum construction.
2. Furnished with four (4) 5” platform type swivel casters.
3. Stores four (4) 13" x 13" milk crates on each level.

ACCESSORIES:

1. Aluminum Drag Hook #1199 (one per unit).

ITEM 65 ALL PURPOSE SHELVING Quantity: 2

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Erecta Shelf®, Solid Flat
(10) 2160FS Solid Shelves
(8) 63PS Posts
2 units

SIZE: 21" x 60"

FINISH: Stainless steel shelves and posts

SPECIAL DESCRIPTION:

1. Five (5) tiers.
2. Four (4) 63" posts.
3. Bottom shelf - 7" AFF.
4. Between bottom and second shelf - 12" (or space for one 1-gallon jar). Between second and third shelves - 12" (or space for one 1-gallon jar). Space remaining shelves evenly. Top shelf to finish even with top of post.

ITEM 66 THAWING RACK Quantity: 1

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Erecta Shelf® Solid Shelving
(2) 2448LS Vented Shelves
(1) 2448FS Solid Shelf

(4) 63UPS Posts
(4) 5MP Casters
1 unit

SIZE: 24” x 48”

FINISH: Stainless steel shelves and posts

SPECIAL DESCRIPTION:

1. Mobile tier of three shelves.

2. Unit is assembled with solid shelf installed adjacent to casters.

3. One (1) vented shelf is installed on top post position, and the other vented shelf is spaced evenly between the top and bottom shelves..

ITEM 67 SHELVING/PLATFORM, 21” x 42” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(2) A2142NK3 Wire Shelves
(1) CC4580B Dunnage Shelves
(4) 63PK3 Posts
1 unit

SIZE: 21” x 42”

FINISH: Metroseal 3 shelves, dunnage rack and posts

SPECIAL DESCRIPTION:

1. Individual unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 40" between the bottom shelf and the second shelf. The overall height is 63". Each unit has four Metroseal posts.

ITEM 68 SHELVING/PLATFORM, 21” x 48” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(16) A2148NK3 Wire Shelves
(8) CC7147 Dunnage Shelves
(25) 63PK3 Posts
(7) 7PK3 Posts
(20) 9995Z “S” Hooks
8 units

SIZE: 21” x 48”

FINISH: Metroseal 3 shelves, dunnage shelves and posts

SPECIAL DESCRIPTION:

1. All individual units except where clips are used. Unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 40" between the bottom shelf and the second shelf. The overall height is 63". Each unit has four Metroseal posts. Only 7" posts shown on drawing. Add on clips per top two shelves as shown on the drawing. Two add-on clips per shelf.

ITEM 69 SHELVING/PLATFORM, 21” x 54” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(14) A2154NK3 Wire Shelves
(7) CC2347A Dunnage Shelves
(23) 63PK3 Posts
(5) 7PK3 Post
(12) 9995Z “S” Hooks
7 units

SIZE: 21” x 54”

FINISH: Metroseal 3 shelves, dunnage shelves and posts

SPECIAL DESCRIPTION:

1. All individual units except where clips are used. Unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 40" between the bottom shelf and the second shelf. The overall height is 63". Each unit has four Metroseal posts. Only 7" posts shown on drawing. Add on clips per top two shelves as shown on the drawing. Two add-on clips per shelf.

ITEM 70 SHELVING/PLATFORM, 21” x 42” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(24) A2142NC Wire Shelves
(12) CC4580A Dunnage Shelves
(39) 63P Posts
(9) 7P Post
(20) 9995Z “S” Hooks
12 units

SIZE: 21” x 42”

FINISH: Chrome shelves and dunnage shelves, plated posts

SPECIAL DESCRIPTION:

1. All individual units except where clips are used. Unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 40" between the bottom shelf and the second shelf. The overall height is 63". Each unit has four plated posts. Only 7" posts shown on drawing. Add on clips per top two shelves as shown on the drawing. Two add-on clips per shelf.

ITEM 71 SHELVING/PLATFORM, 21” x 48” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(16) A2148NC Wire Shelves
(8) CC7147A Dunnage Shelves
(32) 63P Posts
8 units

SIZE: 21” x 48”

FINISH: Chrome shelves and dunnage shelves, plated posts

SPECIAL DESCRIPTION:

1. Individual units consist of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 40" between the bottom shelf and the second shelf. The overall height is 63". Each unit has four plated posts.

ITEM 72 SHELVING/PLATFORM, 21” x 54” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(18) A2154NC Wire Shelves
(9) CC2347R Dunnage Shelves
(28) 63P Posts
(8) 7P Post
(24) 9995Z “S” Hooks
9 units

SIZE: 21” x 54”

FINISH: Chrome shelves and dunnage shelves, plated posts

SPECIAL DESCRIPTION:

1. All individual units except where clips are used. Unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 40" between the bottom shelf and the second shelf. The overall height is 63". Each unit has four plated posts. Only 7" posts shown on drawing. Add on clips per top two shelves as shown on the drawing. Two add-on clips per shelf.

ITEM 73 NOT USED

ITEM 74 SHELVING UNIT, 21” x 48” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(6) A2148NC Wire Shelves
(2) CC7147A Dunnage Shelf
(8) 74P Posts
2 units

SIZE: 21” x 48”

FINISH: Chrome shelves and dunnage shelves, plated posts

SPECIAL DESCRIPTION:

1. Individual units consist of four shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7” from the floor. All the remaining shelves are spaced equally with the top shelf finishing even with the top of the posts. The overall height is 74”. Unit has four plated posts.

ITEM 75 SHELVING/PLATFORM, 21” x 42” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(50) A2142NC Wire Shelves
(25) CC4580A Dunnage Shelves
(88) 74P Posts
(12) 7P Posts
(24) 9995Z “S” Hooks
25 units

SIZE: 21” x 42”

FINISH: Chrome shelves and dunnage shelves, plated posts

SPECIAL DESCRIPTION:

1. All individual units except where clips are used. Unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 52" between the bottom shelf and the second shelf. The overall height is 74". Each unit has four plated posts. Only 7" posts shown on drawing. Add on clips per top two shelves as shown on the drawing. Two add-on clips per shelf.

ITEM 76 SHELVING/PLATFORM, 21” x 48” Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(44) A2148NC Wire Shelves
(22) CC7147A Dunnage Shelves
(87) 74P Posts
(1) 7P Post
(4) 9995Z “S” Hooks
22 units

SIZE: 21” x 48”

FINISH: Chrome shelves and dunnage shelves, plated posts

SPECIAL DESCRIPTION:

1. All individual units except where clips are used. Unit consists of three shelves with the bottom shelf constructed as a heavy duty platform. The bottom shelf is 7" from the floor with 52" between the bottom shelf and the second shelf. The overall height is 74". Each unit has four plated posts. Only 7" posts shown on drawing. Add on clips per top two shelves as shown on the drawing. Two add-on clips per shelf.

ITEM 77 NOT USED

ITEM 78 #10 CAN RACK Quantity: 1

MANUFACTURER: New Age Industrial

MODEL: 97294

SIZE: 27-1/8” wide x 42” long x 81¼” high

SPECIAL DESCRIPTION:

1. All welded aluminum construction.

2. Unit to hold 156 #10 size cans.

3. Lifetime guarantee against rust and corrosion.

ITEM 79 HOSE REEL Quantity: 1

MANUFACTURER: T & S Brass and Bronze Works

MODEL: B-7122-C01 Modified

SPECIAL DESCRIPTION:

1. Plumbing and accessories are concealed body type.
2. Bottom of reel to be installed at 72" AFF.
3. Label and deliver to Plumbing Contractor for installation.
4. Close coordination is required between contractors to ensure that plumbing is non-exposed.

ACCESSORIES:

1. Substitute #B-0107-C Spray Valve Unit with low flow spray head.
2. #B-0513 Mixing Valve (Concealed body type).
3. #ORK-2 Shut-Off Control Valve (Concealed body type).
4. #B-CVV - ½" Check Valves – 2 ea.
5. #B-0963 Continuous Pressure Vacuum Breaker. Note: Provide 3/8" bushings for inlet and outlet.

ITEM 80 CLOTHES WASHER Quantity: 1

MANUFACTURER: General Electric

MODEL: GTWP1800HWS

ELECTRICAL: 120/60/1
NEMA 5-20P

STANDARD FEATURES:

1. Dual-Action agitator.
2. 3.7 DOE cu. ft. capacity.
3. 12 wash cycles, 4 water levels.

4. Rotary electromechanical controls.

ITEM 81 CLOTHES DRYER Quantity: 1

MANUFACTURER: General Electric

MODEL: GTDP490EDWS

ELECTRICAL: 208/60/1
NEMA 6-30P

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor furnishes cord and plug for dryer, labels and delivers to Electrical Contractor for installation.

2. Food Service Equipment Contractor furnishes dryer hose, labels and delivers to Mechanical Contractor for installation.

3. Vent for dryer is provided and installed by Mechanical Contractor.

STANDARD FEATURES:

1. HE Sensor Dry.

2. 7.0 cu. ft. capacity.

3. 13 cycles, 4 heat selections.

4. Rotary electromechanical controls.

ACCESSORIES:

1. One (1) NEMA 6-30P cord and plug, 4 ft. long.

2. Dryer hose (verify length).

ITEM 82 MOP HANGER Quantity: 2

MANUFACTURER: Handy Hanger

MODEL: SS6

ITEM 83 BREAD RACK Quantity: 4 N.I.C.- By Others

ITEM 84 MICROWAVE OVEN Quantity: 1

MANUFACTURER: Panasonic

MODEL: NE-3280

ELECTRICAL: 208/60/1
NEMA 6-30P

STANDARD FEATURES:

1. 3,200 watts of cooking power.

2. Large oven capacity – 1.6 cu. ft. Can accommodate two (2) 4" tall full size pans.

3. 3-stage cooking with 5 power levels.

4. Drop down counter style door.

ACCESSORIES:

1. Cambro Micro Pans, amber:
(2) #12HP Full size, 2½" deep
(4) #24HP Half size, 4" deep
(2) #10HPCH H-Pan covers with handles for full size pans
(4) #20HPCH H-Pan covers with handles for half size pans

ITEM 85 EQUIPMENT STAND Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: VSS-240

SIZE: 30" long x 24 wide x 35½" high

STANDARD FEATURES:

1. 2" x 1" square die embossed NO-DRIP countertop edge.

2. 18 ga. stainless steel undershelf.

ACCESSORIES:

1. One (1) #TA-25 Set of Casters, 2 with brakes.

ITEM 86 EXHAUST HOOD Quantity: N.I.C.-1 By Other Trades

To be supplied and installed by the HVAC (Mechanical) Contractor. Dimensioned location of hood to be provided by the Food Service Equipment Contractor to Mechanical Contractor through the General Contractor. Size as shown on the Food Service Equipment layout drawing is the capture size and does not reflect O.D. of the ventilator. The filters/baffles are stainless steel. The hood is cleaned by the Mechanical Contractor just prior to final acceptance by the Owner. The Mechanical Contractor provides training

to the Food Service personnel on the use, care, cleaning and maintenance of the hood and fire suppression system.

ITEM 87 TRAY/SILVERWARE UNIT Quantity: 2

MANUFACTURER: Colorpoint

MODEL: CPM-MTS Modified

SPECIAL DESCRIPTION:

1. Height of unit to be lowered to 34” to top of rail.

ACCESSORIES:

1. Provide napkin dispensers (1 pair).
2. Wrap-around bumper.
3. 5” dia. swivel casters.

ITEM 88 BAKERS TABLE Quantity: 1 - Existing

SPECIAL DESCRIPTION:

1. Bakers Table is 8'-0" long x 30" wide with tier of 3 drawers on right and table mounted overshelf.
2. Table base and drawer enclosure to be sanded and refinished. Apply hammertone grey enamel paint to match existing.
3. Backsplash ends and rear to be completely enclosed with stainless steel to meet NSF requirements.
4. Existing galvanized drawer pans to be replaced with stainless steel drawer pans, size to match existing.
5. Lubricate drawer slides so that all drawers glide easily. Verify that feet can be adjusted.
6. Food Service Equipment Contractor to pick up equipment at end of school year, deliver to shop for refinishing and store in his warehouse until job site is ready for delivery of equipment. Locate where shown on plan.

ITEM 88A INGREDIENT BIN Quantity: 6 - Existing

SPECIAL DESCRIPTION:

1. Bins are Seco Products Model No. 47-75 stainless steel ingredient bins.

2. Food Service Equipment Contractor to pick up equipment at end of school year and store in his warehouse until job site is ready for delivery of equipment. Locate where shown on plan. Note: Only three (3) shown on plan. Locate additional units in large walk-in freezer.

ITEM 89 MOBILE WORK TABLE, 30" X 96" Quantity: 2

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 8'-0" long x 30" wide x 34" high

FINISH: Stainless steel

SPECIAL DESCRIPTION:

1. See General Requirements.

2. Two (2) single drawers, located on same side. See drawing. Pan size is 20" x 20" x 5". Drawer is attached to top. Table underbracing is not exposed.

3. Sectional removable undershelf. Sections to be sized for sending through Dish Machine.

4. Tente swivel casters with brakes - 5" H.D.

5. Edges - Bull nose.

ITEM 90 TRASH CONTAINER, 40-GAL. Quantity: 1 LOT

MANUFACTURER: Rubbermaid

MODEL: Square Brute Container
3536, 3539, 3530

SPECIAL DESCRIPTION:

1. Provide eight (8) Rubbermaid 40-gal. containers with lids and dollies.

2. Color to be gray.

ITEM 91 AIR CURTAIN Quantity: 1

MANUFACTURER: Berner

MODEL: SHC07-2072A

ELECTRICAL: 120/60/1

SPECIAL DESCRIPTION:

1. Air curtain to be located over rear service area doors.

2. General Contractor to provide two (2) knock-outs in door frame for wiring to microswitches. This allows control wiring to be run in conduit concealed in wall above door. Food Service Equipment Contractor to coordinate with door supplier. See detail.

3. Color to be white.

4. Adjust velocity and direction of air current according to the designed usage.

ACCESSORIES:

1. Two (2) NEMA 1 Plunger Style Door Switches for automatic on/off control.

ITEM 92 AIR CURTAIN Quantity: 6

MANUFACTURER: Berner

MODEL: SLC07-1036A

ELECTRICAL: 120/60/1

SPECIAL DESCRIPTION:

1. Air Curtains to be installed over all walk-in cooler and freezer doors. Food Service Equipment Contractor to ship Air Curtains and control packages to Walk-In Cooler manufacturer for installation.

2. Color to be white.

ACCESSORIES:

1. Six (6) Basic Control Packages (one per unit) with magnetic reed door switch and pre-wired remote mounted load center.

ITEM 93 SILVERWARE SOAK SINK Quantity: 1

MANUFACTURER: Aerowerks or Approved Fabricator

MODEL: Custom

SIZE: 26" wide x 26" long x 24" high

SPECIAL DESCRIPTION:

1. Sink compartment to measure 23" x 23" x 8" deep.

2. Sink to be constructed of 14 ga. Type 304 stainless steel with all corners coved on 5/8" radius. Provide 1-1/2" rolled rims on all top edges. Sink to be mounted on 1-5/8" O.D. stainless steel legs with 5" dia. heavy duty swivel casters.

3. Provide 1-1/2" lever drain with 4" long tailpipe.

4. See Section C on Sht. FS105.

ITEM 94 TOTE DOLLY Quantity: 17

MANUFACTURER: Cambro

MODEL: CD100

SIZE: 28-7/8” long x 19-3/4” wide x 10-1/2” high

SPECIAL DESCRIPTION:

1. One piece seamless, double-wall, high density polyethylene construction.

2. Load capacity is 300 lbs.

3. Four (4) 5" casters, 2 fixed, 2 swivel, 1 with brake.

4. Verify that dollies will work with Owner's tote boxes.

5. Color to be selected by Architect.

ITEM 95 DUNNAGE RACK, 24" X 48" Quantity: 11

MANUFACTURER: New Age Industrial

MODEL: 2009

SIZE: 48" long x 24" wide x 12" high

FEATURES:

1. High tensile extruded aluminum, all welded construction.

2. 2,500 lbs. capacity.

ITEM 96 DUNNAGE RACK, 24" X 60" Quantity: 3

MANUFACTURER: New Age Industrial

MODEL: 2010

SIZE: 60" long x 24" wide x 12" high

FEATURES:

1. High tensile extruded aluminum, all welded construction.

2. 2,000 lbs. capacity.

ITEM 97 WORK TABLE, 24” x 48” Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: TFSS-244

SIZE: 4’-0” long x 24” wide x 35½" high

STANDARD FEATURES:

1. 14 ga. stainless steel top with rolled rim edge on front, square sides and 1½" turn-up at rear.

2. Stainless steel gussets, 1-5/8" dia. tubular stainless steel legs and cross bracing with 1" adjustable stainless steel bullet feet.

ITEM 97A COFFEE MAKER Quantity: 1 N.I.C.- By Others

Food Service Equipment Contractor to show 120/60/1 electrical service and cold water for Coffee Maker on his electrical and plumbing rough-in drawings.

ITEM 97B MICROWAVE OVEN Quantity: 1 N.I.C.- By Others

Food Service Equipment Contractor to show 120/60/1 electrical service for Microwave Oven on his electrical rough-in drawing.

ITEM 98 RECEIVING DESK Quantity: 1

MANUFACTURER: Kelmax (Storage Products Group)

MODEL: 4G0186

SIZE: 24" long x 24" wide x 48" high

STANDARD FEATURES:

1. Stationary unit with lockable lift up storage area.

2. Powdercoat finish on steel.

ITEM 99 LOCKERS Quantity: 1 LOT By Other Trades

Supplied and installed by General Contractor. Lockers to be installed on masonry curb.

ITEM 100 TRAY STAND Quantity: 1

MANUFACTURER: Colorpoint

MODEL: 36-RTE

SIZE: 36-3/8" long x 30" wide x 34" high

SPECIAL DESCRIPTION:

1. See General Requirements, Section 1.23 Fiberglass Reinforced Polyester (Serving Line).

2. 34” counter top height.

3. Tray Stand to accommodate two stacks of 14" x 18" trapezoidal compartment trays (low side).

4. Provide cut-outs in top (high side) for six (6) silverware cylinders. See plan for location. See Accessory 1.

5. Provide cut-out in top (high side) for napkin well. See plan for location. See Accessory 2.

6. Stainless Steel Legs.

7. Color to be selected by Architect.

ACCESSORIES:

1. Six (6) Vollrath #52642 Nylon Silverware Cylinders.

2. One (1) Vollrath #90422 1/4 size stainless steel pan, 2½" deep.

3. Provide and install 22 gauge, Type 304, 18-8 stainless steel trim on customer side to seal unit to floor and wall. Trim is attached to floor with stainless steel fasteners and sealed to body of unit and wall with clear silicon caulking. Use clear silicon caulking described in this section under Installation. Purpose of trim and caulking is to provide a complete seal between the floor, wall and the unit and to close crevices against dirt and vermin. See Sht. FS1.14 Equipment Details, Section thru Floor @ K-5 Serving Line.

ITEM 101 DISH DOLLY Quantity: 2

MANUFACTURER: InterMetro Industries Corporation

MODEL: PCD11A

SIZE: 26-5/8" wide x 26-5/8" deep x 31-7/8" high

STANDARD FEATURES:

1. Seamless molded high-density polymer construction with Microban Antimicrobial protection.

2. Four (4) adjustable removable dividers.

3. Four (4) 5" dia. swivel casters, 2 with brakes.

4. Vinyl cover.

ITEM 102 STAINLESS STEEL WALL CAP Quantity: 1

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 16'-0" long x 8" wide (verify)

SPECIAL DESCRIPTION:

1. Wall cap to be constructed of 14 gauge, type 304 18-8 stainless steel, one piece all welded construction. Cap to be approximate length and width of 48” high wing wall underneath Exhaust Hood with 1½” straight turndown on all exposed edges. Cap to be formed with 30 degree peak in center to conform with Health Dept. requirements. Caulk and seal to wall with clear silicon caulking.

2. See detail on Sht. FS1.14 Equipment Details.

ITEM 103 WALL-MOUNTED SHELF, 10" X 48" Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: WS-10-48

SIZE: 10" wide x 48" long

SPECIAL DESCRIPTION:

1. Mount shelf over Item 97 Work Table at 56" AFF.

NOTE! THE FOLLOWING ITEMS ARE LOCATED IN THE CULINARY KITCHEN:

ITEM CK-1 3-SECTION REACH-IN REFRIGERATOR Quantity: 1

MANUFACTURER: True Food Service Equipment, Inc.

MODEL: T-72

ELECTRICAL: 115/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Oversized, factory balanced refrigeration system maintains 33°F. to 38°F.
2. Bottom mount self-contained refrigeration system using CFC free 134A refrigerant.
3. Stainless steel doors and fronts.
4. White aluminum NSF approved interior liner.
5. Heavy duty PVC coated shelves.
6. Casters.
7. Cord and plug.

ITEM CK-2 1-SECTION REACH-IN FREEZER Quantity: 1

MANUFACTURER: True Food Service Equipment, Inc.

MODEL: T-23F-HC

ELECTRICAL: 115/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Extra large evaporator coil, balanced with higher horsepower compressor and large condenser maintains -10˚F.
2. Bottom mount self-contained refrigeration system using CFC free R290 refrigerant.
3. Automatic defrost system.
4. Stainless steel doors and fronts.
5. White aluminum NSF approved interior liner.

6. Heavy duty PVC coated shelves.

7. Casters.

8. Cord and plug.

ITEM CK-3 HANDWASH SINK Quantity: 2

MANUFACTURER: Advance Tabco

MODEL: 7-PS-90

STANDARD FEATURES:

1. Sink bowl is 10” x 14” x 5” deep.

2. Heavy gauge type 304 stainless steel construction.

3. Includes pedestal base, gooseneck spout, stainless steel basket drain and single pedal mixing valve with built-in check valve.

4. Includes wall mounting bracket.

ITEM CK-4 UTENSIL RACK
Quantity: 1

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(4) A2448NK3 Wire shelves
(4) 63UPK3 Posts for stem casters
(1) EP55C Enclosure panel
(2) 9970Z Enclosure panel retaining clamp
(6) L48N-4C Rear shelf ledge
(4) L24N-4C Side shelf ledge
(1) MTR2448XE Tray drying rack
(4) 5MP Casters
(2) MTB93060W Tote Box
(2) US24NA Drawer slide set
(36) HK23C Hooks
1 unit

SIZE: 24” x 48”

FINISH: Metroseal 3 shelves and posts. Balance to be chrome.

SPECIAL DESCRIPTION:

1. Rack consists of four (4) posts with stem casters and four (4) wire shelves spaced evenly with the bottom shelf installed 6” AFF. Top shelf to finish even with posts. Install enclosure panel on left end from top shelf. Install tray module on bottom shelf. Remaining three shelves to have front, rear and right side shelf ledges. Top shelf to have left side shelf ledge. Top of posts to have end caps. Mount tote boxes and slide sets under second shelf from top. Mount snap-on hooks to enclosure panel. Casters to have donut bumpers.

ITEM CK-5 SALAD PREP TABLE Quantity: 1

MANUFACTURER: Advance Tabco or equal
T & S Brass and Bronze Works

MODEL: TVKS-308

SIZE: Size and shape as shown on drawing.
8’-0” long x 30" wide x 35" high.

STANDARD FEATURES:

1. 14 gauge Type 304 stainless steel top with 2" x 1" square die embossed NO DRIP countertop edge with 1/2" return on three sides and 10" high backsplash with 2" return at rear.

2. Stainless steel legs and gussets with 1" adjustable stainless steel feet. Six 6) legs for tables 8'-0" and over.

ACCESSORIES:

1. Provide #TA-11D-2 Double Bowl Sink, 20" x 20" x 12" deep, welded into countertop. Locate in center of table. Delete swing spout faucet. Relocate center legs to left of sinks.

2. T & S Brass and Bronze Works #B-0133-B Pre-Rinse Unit modified with 50” hose length. Pre-Rinse Unit includes one (1) #B-0156 Add-On Faucet with 12' swing nozzle. Provide #B-0230-K Installation Kit.

3. Label spray/faucet assembly and deliver to Plumbing Contractor for installation.

ITEM CK-6 SHELVING UNIT, 21" X 48" Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Adjustable™ Super Erecta Shelf®
(15) A2148NC Wire Shelves
(12) 74P Posts
3 units

SIZE: 21” x 48”

FINISH: Chrome shelves and plated posts

SPECIAL DESCRIPTION:

1. Individual units consist of five shelves. The bottom shelf is 7” from the floor. All the remaining shelves are spaced equally with the top shelf finishing even with the top of the posts. The overall height is 74”. Unit has four plated posts.

ITEM CK-7 PAN/TRAY RACK Quantity: 1

MANUFACTURER: New Age Industrial

MODEL: 4340

STANDARD FEATURES:

1. Universal Angle Slides spaced 5" O.C.; 12 sets each rack.
2. All aluminum heavy duty "D" tube construction.
3. Four (4) 6" platform type swivel casters, 2" x 6" with non-marking wheels.
4. Lifetime guarantee against rust and corrosion.

ITEM CK-8 WALL-MOUNTED SHELF, 12" X 96" Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: WS-12-96

SIZE: 12" wide x 96" long

SPECIAL DESCRIPTION:

1. Mount shelf over Item CK-22 Work Table at 60" AFF.

ITEM CK-9 WALL-MOUNTED SHELF, 12" X 48" Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: WS-12-48

SIZE: 12" wide x 48" long

SPECIAL DESCRIPTION:

1. Mount shelf over Item CK-3 Handwash Sink at 60" AFF.

ITEM CK-10 FOOD PROCESSOR Quantity: 1

MANUFACTURER: Robot Coupe

MODEL: R2 Dice Ultra

ELECTRICAL: 120/60/1
NEMA 5-15P

SPECIAL DESCRIPTION:

1. Combination food processor with bowl cutter plus attachments for chopping, mincing, slicing, grating, ripple cut, julienne, dicing, emulsions, grinding and kneading.

2. Blade and disc holder to be mounted on wall over Item CK-5 Salad Prep Table.

ACCESSORIES:

1. One (1) 3-Disc Package with ¼" coarse grating, ¼" x ¼" julienne and 1/32" slicing discs.

2. One (1) Wall-Mounted Blade and Disc Holder.

ITEM CK-11 CAN OPENER Quantity: 1

MANUFACTURER: Edlund

MODEL: S-12 C

SPECIAL DESCRIPTION:

1. Can Opener to have stainless steel clamp base.

2. Unit to be mounted on Item CK-22 Work Table. See plan.

3. NSF certified.

ITEM CK-12 5 QUART MIXER Quantity: 5

MANUFACTURER: Hobart Corporation

MODEL: N50

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. Includes 5-qt. stainless steel bowl, "B" flat beater, "D" wire whip, "ED" dough hook and cord and plug.

ITEM CK-13 CONVECTION STEAMER WITH STAND Quantity: 1

MANUFACTURER: Cleveland

MODEL: 22CET6.1

ELECTRICAL: 208/60/3
NEMA 15-50P

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies water connection kit for steamer, labels and delivers to Plumbing Contractor for installation.

2. Food Service Equipment Contractor supplies cord and plug set for steamer, labels and delivers to Electrical Contractor for installation.

ACCESSORIES:

1. 34" High Stainless Steel Economy Stand for one (1) unit.

2. Single Point Water Connection.

3. Six (6) Vollrath #3002-3 12” x 20” x 2½” deep stainless steel perforated steam table pans.

4. 5 ft. FDA Approved National Hose Thread Style Water Connection Kit.

5. Provide NEMA 15-50P cord and plug set, 4 ft. long.

ITEM CK-14 CONVECTION OVEN Quantity: 1

MANUFACTURER: Blodgett

MODEL: Mark V-100

ELECTRICAL: 208/60/3
NEMA 15-50P

SIZE: Single stack. Oven is full size.

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies cord and plug set for oven,

labels and delivers to Electrical Contractor for installation.

STANDARD FEATURES:

1. Stainless steel front, top and sides.
2. Solid state thermostat with temperature control range of 200º - 500ºF.
3. Dual pane thermal glass windows.
4. Five (5) chrome-plated oven racks.
5. Two speed 1/2 horsepower fan motor.
6. Double-sided porcelainized baking compartment liner with coved corners.
7. 25” adjustable stainless steel legs.
8. Three (3) year parts and two (2) year labor warranty.

ACCESSORIES:

1. #SSI-M Solid State Infinite Control with manual timer.
2. Provide one (1) NEMA 15-50P cord and plug set, 4 ft. long.

ITEM CK-15 24" CHARBROILER Quantity: 1

MANUFACTURER: EmberGlo

MODEL: E2424

ELECTRICAL: 208/60/1
NEMA 6-50P

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies cord and plug set for charbroiler, labels and delivers to Electrical Contractor for installation.
2. Separate temperature control for each 12" section.
3. Recessed elements prevent flare-ups.
4. Grate self cleans at "Hi" setting.
5. Includes 4" legs with adjustable feet.

ACCESSORIES:

1. Provide one (1) NEMA 6-50P cord and plug set, 4 ft. long.

ITEM CK-16 36" GRIDDLE Quantity: 1

MANUFACTURER: Garland

MODEL: E-24-36G

ELECTRICAL: 208/60/3
NEMA 15-50P

SPECIAL DESCRIPTION:

1. Food Service Equipment Contractor supplies cord and plug set for kettle, labels and delivers to Electrical Contractor for installation.

2. Provide NEMA 15-50P cord and plug set, 4 ft. long.

ITEM CK-17 EQUIPMENT STAND Quantity: 1

MANUFACTURER: Advance Tabco

MODEL: ES-306 Modified

SIZE: 72" long x 30" wide x 20" high

SPECIAL DESCRIPTION:

1. Stand to accommodate Item CK-15 24" Charbroiler, Item CK-16 36 Griddle and Item CK-20 12" Stainless Steel Filler.

2. Stand to be cut down to 20" working height in order for cooking surface of equipment to be approx. 35" AFF.

ITEM CK-18 INDUCTION RANGE, 6 BURNER Quantity: 1

MANUFACTURER: Lang Manufacturing

MODEL: R136C-ATE

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. 36" electric induction top range with convection oven base.

2. Six (6) 8" dia. induction burners with thermostat controls.

3. Three (3) chrome-plated oven racks provided.

4. Fully insulated oven compartment with right hand heavy duty hinged door.

5. 6" adjustable legs standard.

ITEM CK-19 WALL-MOUNTED SALAMANDER/BROILER Quantity: 1

MANUFACTURER: Garland

MODEL: SERC

ELECTRICAL: 208/60/3

SPECIAL DESCRIPTION:

1. Salamander/Broiler to be mounted on wall above Item CK-18 Induction Range at 54" AFF.

ACCESSORIES:

1. Stainless steel wall-mount brackets.

ITEM CK-20 12" STAINLESS STEEL FILLER Quantity: 1

MANUFACTURER: Approved Fabricator

MODEL: Custom

SIZE: 12" wide x 24" long x 15" high

SPECIAL DESCRIPTION:

1. Filler is 18 ga. Type 304 stainless steel and constructed as a box with the bottom side open. Bottom to have 1" turnback (to inside) on all 4 sides. All seams to be welded closed and polished. All edges to be deburred.

2. Filler to be located between Item CK-15 24" Charbroiler and Item CK-16 36" Griddle. Filler to be sealed to equipment stand with caulking. Use clear silicon caulking described in this section under Installation.

ITEM CK-21 MOBILE WORK TABLE, 30" X 96" Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: SS-308

SIZE: 8'-0" long x 30" wide x 35" high

STANDARD FEATURES:

1. 14 gauge Type 304 stainless steel top with rolled rim on front and back with square side edges.

2. Adjustable undershelf, 18 gauge stainless steel.

3. Stainless steel legs and gussets.

ACCESSORIES:

1. Two (2) #SHD-2020 Drawers, 20" x 20" x 5" deep, one per side (See drawing).

2. Provide #TA-25A Casters (set of 6), 2 with brakes, per table. Casters to have Heavy Duty Urethane Wheels (#TA-25C).

ITEM CK-22 WORK TABLE WITH UNDERSHELF, 30" X 96" Quantity: 3

MANUFACTURER: Advance Tabco or equal

MODEL: FSS-308

SIZE: 8'-0" long x 30" wide x 35" high

STANDARD FEATURES:

1. 14 gauge Type 304 stainless steel top with rolled rim on front, square side edges and 1½" splash at rear.

2. Adjustable undershelf, 18 gauge stainless steel.

3. Stainless steel legs and gussets.

ACCESSORIES:

1. Provide one (1) #US-30-96 Stainless Steel Mid-Shelf, one per table (3 total). Middle shelf to be spaced halfway between bottom shelf and top of table.

ITEM CK-23 3-COMPARTMENT SINK Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: 94-63-54-24RL

SIZE: 109" Overall Length
Drainboard Length - 24"

SPECIAL DESCRIPTION:

1. Sink to be 14 gauge, type 304 stainless steel construction.

2. Sink to be attached to wall at rear turn-up. Attach sink with stainless steel drive-in studs.

STANDARD FEATURES:

1. Stainless steel gussets and channels, type 304 stainless steel legs and stainless steel 1” adjustable feet.

2. Adjustable front and rear crossbracing.

3. Compartment size is 18” x 24” x 14” deep.

4. NSF approved installation. Meets NSF requirement that drain boards are equipped with a backsplash and are integrally welded to the sink.

ACCESSORIES:

1. Provide one (1) T & S Brass and Bronze Works Model B-0230 Faucet with 18” swing nozzle and B-0230-K Installation Kit.

2. Provide three (3) #K-5 Twist Handle Drains with three (3) #K-4 Support Brackets.

ITEM CK-24 WALL-MOUNTED SHELVING, 14" X 42" Quantity: 1 LOT

MANUFACTURER: InterMetro Industries Corporation

MODEL: Super Erecta Shelf®
(4) 1442NK3 Wire Shelves
(8) 1WD14K3 Direct Wall Mount Shelf Supports
4 units

SIZE: 14” x 42”

FINISH: Metroseal 3 shelves and supports

SPECIAL DESCRIPTION:

1. Install shelves over Item CK-23 3-Compartment Sink at 54" AFF and 66" AFF.

ITEM CK-25 MOBILE HOT FOOD CABINET Quantity: 1

MANUFACTURER: Winston

MODEL: HL4522

ELECTRICAL: 120/60/1
NEMA 5-15P

STANDARD FEATURES:

1. “Controlled Vapor Technology" matches water vapor content of food.

2. Electronic differential controls, including food temp and food texture dials.

3. Fully insulated cabinet.

4. Adjustable and removable wire rack supports accommodate (28) 12” x 20” steam table pans and (14) 18” x 26” bun pans.

5. Stainless steel all welded construction.

6. Door with field reversible hinging. Furnish as per plan.

ACCESSORIES:

1. Bumper Guard: Full perimeter bumpers with 5" casters (2 locking, 2 non-locking) Note: Casters to be swivel casters.

2. Window: Window in doors.

ITEM CK-26 COOKS COUNTER WITH SINK Quantity: 1

MANUFACTURER: Advance Tabco or equal

MODEL: EB-SS-3010M Modified

SIZE: 10'-0" long x 31½" wide x 35½" high

SPECIAL DESCRIPTION:

1. Top front and rear to have 1-5/8" rolled rim edges with square edge on ends. Counter to be island style. (See drawings)

2. Provide one (1) #TA-11B Sink, 16" x 20" x 12" deep, welded into countertop on left where shown on drawing. Delete swing spout. Provide knock-outs 8" O.C. for faucet at end of counter (See Accessory 1).

3. Provide two (2) #TA-42 Interior Partitions to create sink compartment on left and roll warmer compartment on right. Delete middle shelves.

4. Sink compartment to have single louvered hinged door. Door to be hinged left.

5. Provide #TA-92 12" Apron at roll warmer compartment. Adjust height as

required to accommodate Item CK-27 2-Drawer Food Warmer.

6. Center compartment to have fixed middle shelf approximately 5'-0" long.

ACCESSORIES:

1. One (1) T & S Brass & Bronze Works #B-0221-EE Deck Mounted Faucet with 12" swing nozzle.

ITEM CK-27 2-DRAWER FOOD WARMER Quantity: 1

MANUFACTURER: Hatco

MODEL: HDW-2B

ELECTRICAL: 120/60/1

SPECIAL DESCRIPTION:

1. Food Warmer to be built into Item CK-26 Cooks Counter with Sink. (See drawings)

ITEM CK-28 NOT USED

ITEM CK-29 MOP SINK CABINET Quantity: 1

MANUFACTURER: Advance Tabco

MODEL: 9-OPC-84

SIZE: 25” long x 21-5/8” wide x 84” high

STANDARD FEATURES:

1. 16 ga. Type 304 stainless steel 16" x 20" x 12" sink bowl.

2. 18 ga. Type 304 stainless steel cabinet with louvered panels for ventilation.

3. Hinged doors with lock.

4. One (1) fixed stainless steel shelf.

5. Mop holder.

ACCESSORIES:

1. One (1) #K-240 Service Faucet.

2. Right hand door swing.

ITEM CK-30 EXHAUST HOOD Quantity: N.I.C.-2 By Other Trades

To be supplied and installed by the HVAC (Mechanical) Contractor. Dimensioned location of hood to be provided by the Food Service Equipment Contractor to Mechanical Contractor through the General Contractor. Size as shown on the Food Service Equipment layout drawing is the capture size and does not reflect O.D. of the ventilator. The filters/baffles are stainless steel. The hood is cleaned by the Mechanical Contractor just prior to final acceptance by the Owner. The Mechanical Contractor provides training to the Food Service personnel on the use, care, cleaning and maintenance of the hood and fire suppression system.

PART 3 - EXECUTION

3.01 INSTALLATION

Installation requirements, generally, are outlined throughout this Section.

Where there are gaps or spaces over 1/8" between walls and equipment, at tops of backsplashes, between adjoining pieces of equipment, etc., necessary trim strips are furnished for the proper finishing in installation. Necessary measurements for trim strips are taken during the time of installation in order to afford proper fit. Wall trim is made generally from 22 gauge Type 304, 18-8 stainless steel, broke to provide a tight fit. Trim is attached to backsplash (metal) with adhesive. Exposed fasteners may not be used to attach trim to metal backsplashes. In all other instances stainless steel fasteners may be used to attach trim to walls and equipment if equipment finish is stainless steel. Non-corrosive fasteners are required if equipment finish is not stainless steel. Fasteners supplied and installed by other contractors to attach conduit and other materials to the Food Service Equipment must meet the preceding specifications. Trim is sealed to wall and equipment with clear silicon caulking; see installation requirements this Section.

Install closure plates and strips here required, of same material as equipment with joints coordinated with units of equipment. Joints are sealed with clear silicon caulking; see description of caulking types, this Section.

Install insulation insulation where indicated by industry standards and sealants and gaskets all around each unit and penetration or as required to make joints air-tight, waterproof, vermin-proof and sanitary for cleaning purposes. In general, clear silicon caulking is the sealant. In general, make sealed joints not less than 1/8" wide and stuff with backer rod to shape sealant bead properly, at ¼" depth. Shape exposed surfaces of sealant slightly concave, with edges flush with faces of material at joint. Anchor gaskets mechanically or with adhesives to prevent displacement.

Conduit seal-offs are required for penetrations into walk-in cooler/freezer.

Mastic is required between fasteners and equipment or trim and equipment when

non-similar metals are used to prevent rusting through electrolysis. Rubber grommets are required where plumbing lines and connections penetrate splashes to prevent corrosion. Food Service Equipment Contractor supplies, labels and delivers rubber grommets to Plumbing Contractor for installation.

All tables with single or multiple compartment sinks and single or multiple compartment sinks are attached to the wall with 12” stainless steel Z clips, unless noted otherwise, and sealed with clear silicon caulking if located adjacent to wall.

Top shelf on all shelving and shelving/platform units, unless noted otherwise, is installed even with the top of the posts.

I. Air doors are adjusted to regulate the velocity and volume of air at the air outlet for the purpose intended. The color is specified or selected by the Architect; see Itemized Specifications.

J. One hundred percent clear silicon caulking approved for use with food and rated to withstand temperatures up to 400º F. is used when caulking comes in contact with 190º F. water. General Electric sealant SCS 1000 and SCS 1200 and Component Hardware Silicone Sealer are the standards.

K. Caulking required with glass, copper, mill finish aluminum, galvanized steel, many plastics, stone, concrete and masonry finishes and rated to withstand temperatures up to 400º F. is General Electric sealants, Silglaze N or Gesil N depending upon the cure time required and the color specified. These sealants are only used with non-food contact surfaces. Examples: Floor level, trim at dish room openings and pass-thru openings.

L. Light fixtures over the door frames of walk-in refrigeration boxes are installed at a height sufficient to accommodate installation of strip curtains, if specified.

M. Equipment may not be delivered, removed from crates, set-in-place until as a minimum all painting has been completed; ceilings, hood and ventilation duct work are in place; floor is acid cleaned; and all rough-in connections are in place. Site must be ready for final connections.

N. All thermometers, timers, thermostats for all equipment is tested and calibrated to proper operating conditions.

O. See "Work by Other Contractors", this Section for additional requirements.

P. The equipment under the hood is positioned to allow for proper capture. Refer to drawings. Food Service Equipment Contractor is responsible for coordinating with all other contractors the proper locations of service connections under the hood to maintain floor space for equipment and the space in front of and behind or between the equipment under the hood as shown on the enlarged Kitchen Equipment Floor Plan.

Q. Food Service Equipment Contractor is responsible for coordinating the placement of the hood to maintain working aisle spaces.

R. If sprinkler heads are installed inside walk-in cooler/freezer box, Food Service Equipment Contractor is responsible for insulating and sealing penetrations properly to prevent condensation and ice formation.

3.02 QUALITY AND GUARANTEE

A. It is the purpose and intention of these specifications to obtain equipment of the highest quality commercially manufactured.

B. All equipment is guaranteed by the Food Service Equipment Contractor to be free from defects in workmanship and/or material for a period of one (1) year from the date of substantial completion of same by the Architect and Owner. This guarantee covers replacement of defective material at Food Service Equipment Contractor's expense, including parts, mileage, service, transportation and labor, but it does not cover any cost whatsoever for replacement of parts or work made necessary by carelessness or misuse of equipment. All Refrigeration units have a five (5) year non-prorated replacement warranty on the compressor from the date of substantial completion of same by the Architect and Owner. Extended warranties are specified in the Itemized Equipment Specifications, this Section. Final acceptance will not be granted until all items on the inspections reports have been corrected.

C. Food Service Equipment Contractor has ninety days from receipt of written first inspection report to correct items on the report. Partial acceptance will not be granted.

D. Retainment funds will not be released until all inspection items are corrected.

3.03 TESTING AND START-UP INSTRUCTIONS

A. After all utility connections to equipment have been made by other contractors, Food Service Equipment Contractor starts-up, adjusts, levels and calibrates all equipment. Calibrate all thermometers, timers and thermostats. After start-up and adjustment, Food Service Equipment Contractor conducts final test of equipment before requesting first inspection by Architect and his Food Service Equipment Consultant.

B. Delay start-ups of food service equipment until service lines have been tested, balanced, and adjusted for pressure, voltage and similar considerations, and until water and steam lines have been cleaned and treated for sanitation by other Contractors.

C. Test each item of operational equipment to demonstrate that it is operating properly, and that controls and safety devices are functioning. Repair or replace equipment which is found defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

3.04 MANUALS FOR OWNER

A. Food Service Equipment Contractor, upon completion of work, to deliver to the Architect's Food Service Consultant for review three (3) sets of Operation and Maintenance Manuals. Manuals to include the following information:
   1. Warranty statement indicating date of start-up for equipment.
   2. List of authorized service agencies including name, address and telephone number.
   3. Service information organized in a chart format including item description, manufacturer, model, electrical and mechanical characteristics, and serial number.
   4. Specification sheets on all items of equipment marked as supplied. Any variations from the original specifications to be noted.
   5. Operation and Instruction manuals for each item of equipment including information on the care of finished surfaces.
   6. Parts lists.
   7. As built shop drawings for all custom equipment.

B. Give particular attention to concealed work on drawings and specification sheets, which would be difficult to measure and record or be readily discerned at a later date. Note related change order numbers where applicable.

C. Organize and assemble all information into three (3) individual hardback vinyl loose-leaf binders properly identified and <u>indexed by manufacturer</u>. Binder to include two pocket folders for folded sheet information. Mark the appropriate identification on both the front and spine of each binder. Binder for site has identification as such on the front and spine.

D. Organize drawing sheets into manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on cover of each set.

E. Manuals are assembled and ready to use during demonstration and training.

F. After review and approval of manuals by Food Service Equipment Consultant, manuals are transferred to Owner with transmittal letter and distributed as follows: (1) On-site, (1) Food Service Director's office, (1) Maintenance office. Copy of transmittal is sent to Architect and Food Service Equipment Contractor.

3.05 GENERAL OPERATING AND MAINTENANCE INSTRUCTIONS

A. Food Service Equipment Contractor furnishes a qualified representative to instruct and demonstrate to the Owner's Personnel, at project site, the proper operation, care and maintenance of all equipment involved, including the care of finished surfaces. The date and time is designated by the Food Service Director of the facility. Two (2) days are required as a minimum. Equipment must be operable before training; all final connections must be made and start-up and adjustment completed.

B. It is noted that for the purposes of scheduling, all contractors including the Food Service Equipment Contractor must be finished with their work, and all

requirements as stated in the specifications completed a minimum of two weeks before the first day of operation. Exception: training requirements and submittal of close-out documents.

C. As part of this instruction, provide a detailed review of the information assembled in the Operation and Maintenance Manuals and the following items which are not inclusive:
   1. Maintenance Manuals
   2. Operation Manuals
   3. Tools
   4. Spare parts and materials
   5. Lubricants
   6. Fuels
   7. Identification system
   8. Control sequences
   9. Hazards
   10. Cleaning

D. For operational equipment also demonstrate:
   1. Start-up
   2. Shut-down
   3. Emergency operations
   4. Safety
   5. Economy/efficiency adjustments
   6. Effective energy utilization

E. Provide laminated copy of a shortened version of the operation, cleaning and maintenance instructions for all items requiring electrical and/or gas service; walk-ins, refrigerators, disposal, sink heater, booster heater, serving line equipment and air curtains are excluded.

F. Review maintenance and operations in relation with applicable warranties.

G. The training is coordinated with the unit's menu and the planned utilization of the facilities. It is the responsibility of the Food Service Equipment Contractor to become familiar with the facility's menu, planned flow of work and planned utilization of the equipment and facilities.

H. Provide one copy of an operation and maintenance DVD for each piece of equipment, if available. DVDs are labeled and delivered to the Owner at the conclusion of the required training. DVDs become the property of the Owner. A listing of the DVDs provided to the Owner is submitted to the Food Service Consultant.

I. Prior to final application for payment, perform all instructional requirements with Owner's authorized personnel. Submit written documentation, signed by the personnel receiving instruction, that training was received and the date it was given. Submit written documentation that keys were transmitted to Owner. Provide Owner's representatives' names, titles, and signatures for all items

specified.

3.06 FINAL CLEANING

A. General: Provide final cleaning of all equipment both inside and outside, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class cleaning and maintenance program. Comply with manufacturers' instructions for cleaning operations. Final cleaning of the food service equipment by the Food Service Equipment Contractor is not scheduled until all contractors other than Food Service Equipment Contractor have completed their work. Food Service Equipment Contractor and General Contractor coordinate timing of the final cleaning to allow sufficient time for the Food Service Equipment Contractor to complete his final adjustments; to schedule inspection by the Architect and his Food Service Consultant; and to schedule training of the Food Service employees (training requires a minimum of two days). The preceding must occur before training is scheduled and Owner occupies the kitchen. The following are examples, but not by way of limitation, of cleaning levels required.

B. Remove protective coverings and labels which are not required as permanent labels.

C. Clean glazed materials, including glass shelves and sneeze guards, to a polished condition, removing substances which are noticeable as vision-obscuring materials. Replace broken glass.

D. Restore exposed and semi-exposed finishes to remove abrasions and other damages.

E. Clean exposed exterior and interior hard-surfaced finishes, including metals, painted surfaces, plastics, special coatings, and similar surfaces, to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition.

F. Wax all fiberglass materials with paste car wax. Polish out any marks in wax or re-wax if necessary.

G. Replace work which cannot be successfully restored.

H. Polish exposed-metal surfaces and touch-up painted surfaces.

I. Boil out fryers.

J. Clean the interior and exterior of all the food service equipment to a condition of sanitation ready and acceptable for intended food service use.

K. It is the sole responsibility of Food Service Equipment Contractor to protect with vinyl coverings, etc. to maintain clean status of equipment between cleaning and occupancy. Protective coverings are removed immediately before Owner occupies the area.

L. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

M. Cleaning is completed by the General and Food Service Equipment Contractors before requesting first inspection by Architect and his Food Service Equipment Consultant.

N. Any damage to wall and floor finishes or any other materials furnished by other trades during the installation of the food service equipment by the Food Service Equipment Contractor is corrected at the expense of the Food Service Equipment Contractor. Any damage to the Food Service Equipment by other trades during installation is corrected at the expense of the other trade(s) responsible.

3.07 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. Complete the requirements included in this Section.

B. Submit Operation and Maintenance Manuals to Food Service Equipment Consultant for review at first inspection.

C. Submit Record Document for Architect/General Contractor.

D. Deliver physical items such as unattached accessories to Owner.

E. Transmit keys to Owner. Each key is labeled by description and Item Number. Submit to Architect/General Contractor written acknowledgement signed by Owner's representative. that keys were received.

F. Complete start-up, adjustment, leveling and calibration of all equipment.

G. Conduct final test of equipment.

H. Touch-up and otherwise repair and restore marred exposed finishes.

I. Complete final cleaning requirements.

J. Complete operating and maintenance training. Specifics outlined in this Section.

K. Request first inspection by Architect and his Food Service Consultant. Preceding paragraphs "Prerequisites To Substantial Completion" must be completed before inspection is scheduled.

L. From receipt of written first inspection report prepared by Architect and his Food Service Consultant, Food Service Equipment Contractor has ninety days to complete corrections. Notification of receipt is made to Architect and his Food Service Consultant by Food Service Equipment Contractor. At the end of the

ninety day period, if final inspection by Architect and his Food Service Consultant has not been scheduled by the Food Service Equipment Contractor, AIA procedures for correction of the deficiencies by others at the expense of the Food Service Equipment Contractor may be initiated.

3.08 PREREQUISITES TO FINAL ACCEPTANCE

A. Submit to Architect copy of Architect's and his Food Service Consultant's first inspection report of itemized work to be completed or corrected, stating that each item has been corrected or otherwise resolved for acceptance. At same time request a final inspection by Architect and his Food Service Equipment Consultant.

B. If third inspection is required through no fault of the Architect, his Food Service Consultant or Owner, the Food Service Equipment Contractor is required to pay the fees and expenses of the Architect and his Food Service Consultant for reinspection. The costs are paid by the Owner deducting the amount from the final payment due the Food Service Equipment Contractor.

C. If applicable, submit Contractor's Affidavit of Release of Liens, AIA Document G-706A; Contractor's Affidavit of Payment of Debts and Claims, AIA Document G-706; Consent of Surety Company to Final Payment, AIA Document G-707 to Architect.

3.09 RECORD DOCUMENT SUBMITTAL

A. Instructions are given in the General and Supplementary Conditions and other General Sections as well as this Section.

B. Record document includes but is not limited to the following:
   1. Provide one (1) set of as-built shop drawings including floor plan, dimensioned electrical and mechanical rough-in drawings and equipment schedule; as-built shop drawings showing elevations, cross-sections, and details of all custom equipment as provided with the submittals. Give particular attention to concealed work which would be difficult to measure and record at a later date. Note any deviations from the original drawings and specifications. Note related change order numbers where applicable.
   2. Provide one (1) submittal booklet for all buy-out items (See Submittals, this Section) marked as supplied including variations from the manufacturer's instructions and recommendations for installation. Note related change order numbers where applicable.

C. Submit directly to Architect and/or General Contractor as required.

3.10 SPECIAL CONDITIONS

A. The work of the Food Service Equipment Contractor must be closely coordinated with the General Contractor on all aspects of the Contract including scheduling and execution of the Contract.

B. The General Contractor and Food Service Equipment Contractor shall follow the following conditions: Equipment is not delivered, removed from crates, set-in-place for final connections until as a minimum all painting has been completed; ceilings, hood and ventilation duct work are in place; floor is acid cleaned; and all rough-in connections are in place. Site must be ready for final connections. Before final cleaning of equipment by the Food Service Equipment Contractor, work by all other trades and the General Contractor must be completed including final cleaning of the floor by the General Contractor and the hood by the (HVAC) Mechanical Contractor to a condition ready for use. If at any time the Food Service Equipment Contractor deems that this schedule cannot be met, the Architect must be contacted immediately for instructions.

C. Food Service Equipment Contractor is responsible for initiating and maintaining contact with the General Contractor to ensure that proper construction is provided for the equipment.

D. Food Service Equipment Contractor is responsible for coordinating all information requested by the General Contractor and other trades and as required by the contract documents. All such information is submitted through the General Contractor and/or Architect, if food service equipment is bid as a separate contract, with copy forwarded to Architect's Food Service Consultant.

E. General Contractor is responsible for the overall coordination of the installation of the Food Service Equipment. See this Section for specific details.

F. The Owner retains the right to delete equipment from the bid at the same costs as shown on the itemized cost listing for ninety days after the bid opening date.

G. All specifications, General Conditions and requirements apply to all equipment, existing and new.

H. All discrepancies, conflicts, disagreements, etc., arising between the General Contractor and/or his sub-contractors and the Food Service Equipment Contractor are brought to the attention of the Architect immediately for his/her decision which is final.

I. The Owner retains the right to waiver any technicalities; to award the bid to other than the low bidder; to reject any or all bids or any part of any or all bids; to waiver informalities therein.

J. Turn-key situation is required from all contractors. Facility must be ready for use.

END OF SECTION 11 40 00

SECTION 11 53 13 - FUME HOODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Fume Hoods.

B. Related Sections include the following:
   1. Division 09 Section 09 65 00, "Resilient Flooring and Accessories"
   2. Division 12 Section 12 35 53, "Laboratory Casework"
   3. Division 15 Section 15 40 00, "Plumbing"
   4. Division 15 Section 15 50 00, "Heating, Ventilating and Air Conditioning "
   5. Division 26 Section 26 00 00, "General Electrical"
   6. Related Work To Be Performed By Others:
      a. Final installation of all plumbing, service and electrical fixtures attached to fume hood or countertop (excluding piping and wiring within fume hoods).
      b. Final connection to service lines of all plumbing, service and electrical fixtures attached to laboratory casework or fume hoods.

1.3 FUME HOOD GENERAL DESIGN REQUIREMENTS

A. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.

B. Design fume hoods for consistent and safe air flow through the hood face. Negative variations of face velocity shall not exceed 20 percent of the average face velocity at any designated measuring point as defined in this section.

C. Average illumination of work area: Minimum 80 footcandles. Work area shall be defined as the area inside the superstructure from side-to-side and from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.

D. Fume hood shall be designed to minimize static pressure loss with adequate slot area and bell shaped exhaust collar configuration. Maximum average static pressure loss readings taken three diameters above the hood outlet from four points, 90 degrees apart, shall not exceed the following maximums with sash in full open position:

E. Face Velocity Measured S.P.L. (W.G.)

75 F.P.M.	0.18 inches
100 F.P.M.	0.30 inches
125 F.P.M.	0.45 inches
150 F.P.M.	0.60 inches

F. Fume hood shall maintain essentially constant exhaust volume at any baffle position for safety. Maximum variation in exhaust CFM, static pressure and average face velocity as a result of baffle adjustment shall not exceed 5 percent for any baffle position at the specified face velocity.

G. Fume hoods shall be field convertible, from bypass style to auxiliary air by simple component replacement or addition. Change-over shall be accomplished without construction modifications and without special tools.

H. Noise Criteria: Test data of octave band analysis verifying hood is capable of a 50 NC value when connected to a 50 NC HVAC source. Reading taken 3 feet in front of open sash at 100 fpm face velocity.

1.4 LINER SURFACE FINISH PERFORMANCE REQUIREMENTS

A. Test procedure:
1. Test No. 1 - Spills and Splashes:
   a. Suspend in a vertical plane a 42 inches (horizontal) by 12 inches (vertical) panel divided into 3/4 inch wide vertical columns, each column numbered 1 through 49.
   b. Apply five drops of each reagent listed with an eye dropper.
   c. Apply liquid reagents at top of panel and allow to flow down full panel height.

(CAUTION Flush away any reagent drops.)

2. Test No. 2 - Fumes and Gases:
   a. Divide 24 inch x 12 inch panel into 2 inch squares, each square numbered 1 through 49.
   b. Place 25 milliliters of reagent into 100 milliliter beakers and position panel over beaker tops in the proper sequence.
      1) Note: Beaker pouring lip permits atmospheric oxygen to enter and participate in the reaction of the reagent fumes.
3. After 24 hours remove panel, flush with water, clean with naphtha and detergent, rinse, wipe dry and evaluate.

B. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:
1. No Effect: No detectable change in surface material.
2. Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.
3. Good: Clearly discernible change in color or gloss, but no significant impairment of work surface function or life.
4. Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period
5. Failure: Pitting, cratering or erosion of work surface material; obvious and

significant deterioration.

C. Test Results: "P" Fume Hood Liner

	REAGENT LIST Concentrations by Weight	Test No. 1 Rating Spills	Test No. 2 Fumes
1.	Sodium Hydroxide Flake	--N/A--	No Effect
2.	Sodium Hydroxide, 40%	Excellent	No Effect
3.	Sodium Hydroxide, 20%	Excellent	No Effect
4.	Sodium Hydroxide, 10%	Excellent	No Effect
5.	Ammonium Hydroxide, 28%	No Effect	No Effect
6.	Eldorado - Plus (Solution)	No Effect	No Effect
7.	Chloroform	Excellent	No Effect
8.	LpH SE (Solution)	No Effect	No Effect
9.	Trichloroethylene	Excellent	No Effect
10.	Monochlorobenzene	Excellent	No Effect
11.	Tincture of Iodine	Excellent	Excellent
12.	Methyl Alcohol	No Effect	No Effect
13.	Ethyl Alcohol	No Effect	No Effect
14.	Butyl Alcohol	No Effect	No Effect
15.	Phenol, 85%	Excellent	No Effect
16.	Cresol	Excellent	No Effect
17.	Sodium Sulfide, Saturated	Good	No Effect
18.	Furfural	Fair	No Effect
19.	Dioxane	No Effect	No Effect
20.	Zinc Chloride, Saturated	No Effect	No Effect
21.	Benzene	Excellent	No Effect
22.	Toluene	Excellent	No Effect
23.	Xylene	Excellent	No Effect
24.	Gasoline	Excellent	No Effect
25.	Naphthalene	Excellent	No Effect
26.	Methyl Ethyl Ketone	Excellent	No Effect
27.	Acetone	Excellent	No Effect
28.	Ethyl Acetate	Excellent	No Effect
29.	Amyl Acetate	Excellent	No Effect
30.	Ethyl Ether	Excellent	No Effect
31.	Silver Nitrate, 10%	Good	No Effect
32.	Di Methyl Formamide	No Effect	Excellent
33.	Formaldehyde, 37%	No Effect	No Effect
34.	Formic Acid, 88%	No Effect	No Effect
35.	Acetic Acid, Glacial	No Effect	No Effect
36.	Dichloro Acetic Acid, 93%	Excellent	Excellent
37.	Chromic Acid, Saturated	Good	No Effect
38.	Phosphoric Acid, 85%	No Effect	No Effect
39.	Sulfuric Acid, 33%	No Effect	No Effect
40.	Sulfuric Acid, 77%	Excellent	No Effect
41.	Sulfuric Acid, 93%	Good	No Effect
42.	Hydrogen Peroxide, 30%	No Effect	No Effect
43.	Acid Dichromate	Excellent	No Effect

44.	Nitric Acid, 20%	Excellent	No Effect
45.	Nitric Acid, 30%	Excellent	No Effect
46.	40 & 47 Equal Parts	Excellent	Good
47.	Nitric Acid, 70%	Excellent	Good
48.	Hydrochloric Acid, 37%	No Effect	Excellent
49.	Hydrofluoric Acid, 48%	No Effect	Failure

1.5 SUBMITTALS

A. Shop Drawings: Indicate equipment locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances and all required clearances.

B. Product Data: Submit manufacturer's data for each component and item of equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements and locations.

C. Samples: Submit 3 x 6 inch samples of finish for fume hood, work surfaces and for other pre-finished equipment and accessories for selection by Architect.

D. Test Reports: Submit test reports on each size and type of hood verifying conformance to test performances specified. Test report must accompany each hood as part of installation and usage package. Submit independent test reports as required by specification.

E. Instructions: Submit for review and approval.
   1. Instructions to be inscribed on instruction plate to be attached to hood, as specified in PART 2 of this Section.
   2. Written instructions in booklet form providing additional details on safe and proper operation and maintenance.
   3. Professional quality video-minimum 15 minutes in length on proper hood usage.

1.6 QUALITY ASSURANCE

A. Single source responsibility: Fume hood casework, work surfaces, and other equipment and accessories shall be manufactured or furnished by a single furniture company.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled employees to produce high quality casework and equipment, and shall meet the following minimum requirements:
   1. Five years or more experience in manufacture of casework and equipment of type specified.
   2. Ten installations of equal or larger size and requirements.
   3. UL 1805 Specification: Fume Hood must be Underwriters Laboratories subject 1805 classified. The 1805 standard covers electrical and mechanical hazards, investigates the flammability of materials and measures the effectiveness of airflow characteristics. Proper labeling must be affixed to the face of each fume hood indicating classification to

the UL 1805 standard for Fume Hoods. UL listing covering electrical components only or other listings that do not encompass all issues covered in UL 1805 is insufficient. All factory testing shall be performed in a U.L. certified test facility.

4. Fume hood compliance with NFPA requirements as it pertains to materials used and construction, as well as the National Electrical Code. UL 1805 signifies that any electrical & methods used comply with NEC (National Electrical Code) and all materials have a flame spread index of less then 25.

C. Installer's qualifications: Factory certified by the manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark cardboard in large lettering "No Standing".

1.8 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
1. Windows and doors are installed and the building is secure and weather tight.
2. Ceiling, overhead ductwork and lighting are installed.
3. All painting is completed and floor tile located below casework is installed.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Casework and equipment manufacturer: Mott Manufacturing

B. Labconco

C. ALC-Collegedale

D. Air Master Fume Hoods - Eliminator 100 Series, Airfoil Fume Hood.

E. Campbell-Rhea Fume Hoods.

2.2 FUME HOOD MATERIALS

A. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM A366; gauges U.S. Standard and galvanized.

B. Stainless steel: Type 304; gauges U.S. Standard.

C. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.

D. Bypass grilles: Low resistant type, 18 gauge steel, upward directional louvers.

E. Safety glass: 7/32 inch thick laminated safety glass.

F. Sash cables: Stainless steel, uncoated, 1/8 inch diameter military spec. quality. (MIL-W-83420D-3).

G. Sash guides: Corrosion resistant poly-vinyl chloride.

H. Pulley assembly for sash cable: 2 inch diameter, zinc dichromate finish, ball bearing type, with cable retaining device. (Nylon tired-not acceptable.)

I. Sash pull: Full width corrosion resistant plastic, stainless steel or steel with chemical resistant powder coating.

J. Gaskets: 70 durometer PVC for interior access panels. Gasket interior access panels to eliminate air leakage and to retain liquids inside hood.

K. Fastenings:
   1. Exterior structural members attachments: Sheet metal screws, zinc plated.
   2. Interior fastening devices concealed. Exposed screws not acceptable. (Screw head "caps" not acceptable.)
   3. Exterior panel member fastening devices to be corrosion resistant, non-metallic material. Exposed screws not acceptable.

L. Instruction plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories, baffle settings and use of sash.

2.3 FUME HOOD CONSTRUCTION

A. Superstructure: Rigid, self supporting assembly of double wall construction, maximum 4 7/8 inch thick.
   1. Wall consists of a sheet steel outer shell and a corrosion resistant inner liner, and houses and conceals steel framing members, attaching brackets and remote operating service fixture mechanisms and services. Panels must be attached to a full frame construction, minimum 14 gauge galvanized members. Panels and brackets attached to eliminate screw heads and metallic bracketry from hood interior.
   2. Access to fixture valves concealed in wall provided by exterior removable access panels, gasketed access panels on the inside liner walls, or through removable front posts.

B. Exhaust outlet: Rectangular with ends radiused, shaped and flanged, 18 gauge steel finished with Chameleon powder coating.

C. Access opening perimeter: Air foil or streamlined shape with all right angle corners radiused or angled. Bottom horizontal foil shall provide nominal one inch bypass when sash is in the closed position and relatively flush with the top of the work surface. Bottom foil shall be removable without use of special tools. Bottom foil shall provide access areas for electrical cords. Bottom foil: Steel with urethane powder coating to increase acid and abrasion resistance.

D. Fume hood sash: Full view style with clear, unobstructed, side-to-side view of fume hood interior and service fixture connections.
   1. Bottom sash rail: 2 inch maximum, 18 gauge steel with urethane powder coat finish. Provide integral formed, flush pull the full width of bottom rail.
   2. Set safety glass into rails in deep form, extruded poly-vinyl chloride glazing channels.
   3. Counter balance system: Single weight, pulley, cable, counter balance system which prevents sash tilting and permits one finger operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full length of travel. Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure. Life cycle test 100 pound sash and weight to 100,000 cycles without sign of failure. Provide independent test data.
   4. Postless sash design: Per drawing details.
   5. Open and close sash against rubber bumper stops.

E. Fume hood liner: Polyresin (product number denoted by the suffix "P"): Reinforced polyester panel; smooth finish and white color in final appearance. Flexural strength: 14,000 psi. Flame spread: 25 or less per U.L. 723 and ASTM E84-80.

F. Baffles: Baffles providing controlled air vectors into and through the fume hood must be fabricated of the same material as the liner. Provide exhaust slots full height on vertical sides of the baffle with upper slots adjustable. All baffle supports/brackets to be non-metallic.

G. Remote baffle adjustment: Toggle style, one handed, single point control, accomplished while hood is in use, without disturbing apparatus, from outside right hand corner post of fume hood with sash in either the open or closed position, and permitting setting for (1) high thermal loading and (2) normal or average operation.
   1. Remote adjuster: Toggle style control handle and an acid resistant label indicating proper control handle location for baffle function.
   2. Rigidly correlate control handles to baffle positioner; cable-type adjustments are not acceptable
   3. Design baffle adjuster to engage and disengage from the adjustable baffle without the use of tools.
   4. Must comply with OSHA Lab Standard Guidelines.
   5. Baffles providing no adjustment or requiring internal manipulations are not acceptable.
   6. Non-metallic supports and fasteners required inside of hood.

H. Service fixtures and fittings: Color coded washers at hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color coded index handles.
   1. Valves: Needle-point type with self-centering cone tip and seat of hardened stainless steel. Tip and seat shall be removable and replaceable.
   2. Provide piping for all service fixtures from valve to outlet: Galvanized iron or copper for water, air and vacuum and black iron for gas services.
   3. Fixtures exposed to hood interior: Brass with chemically resistant black powder coating.
   4. Remote control handles: Black nylon four-arm handle with nylon color-coded index buttons.
   5. Services: As shown or specified.

I. Hood light fixture: Two lamp/T8, rapid start, UL listed fluorescent light fixture with sound rated ballast installed on exterior of roof. Provide safety glass panel cemented and sealed to the hood roof.
   1. Interior of fixture: White, high reflecting plastic enamel.
   2. Size of fixture: Largest possible up to 48 inches for hoods with superstructures up to six feet. Provide two 36 inch fixtures for hoods with eight foot superstructures.
   3. Include lamps with fixtures.
   4. Illumination: Per performance values, PART 1 of this Section.

J. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Provide 250 V.A.C. receptacles where specified. Flush plates: Black acid resistant thermoplastic.

K. Work surfaces:1 1/4 inch thick surface, dished a nominal one-half inch to contain spills. Molded resin work surfaces for hoods with cement-based board or polyresin liners.

L. Safety Monitor/Alarm System: Provide Safety Monitor/Alarm System which monitors face velocity and provides audible and visual alarm if face velocity drops below safe levels. The technology used in the 54LAFA1000 will be based on thermally compensated thermistor based in the alarm module. As the internal fume hood pressure changes as the sash opening is closed and opened, the flow passing over the thermistor is calibrated to a face velocity which is displayed on the front of the monitor.
   1. Safety monitor: UL listed, tamper proof, with all alarm circuits, electric components, external tubing, and manifolds furnished complete and factory installed. The monitor shall have light emitting diode display which provides clear indication of airflow conditions.
   2. Calibration is the responsibility of the owner and is required once the hood is stationed and the hood exhaust and room supply systems are balanced. A secondary calibration has been factory set into the alarm's memory only to determine that the alarm is functional and ready for shipment. The primary calibration must be completed in the field.
   3. Airflow sensor: Thermally compensated glass-beaded thermistor, factory connected to a sidewall port on the interior of the fume hood.
   4. Alarm Signal: Audible signal and a visual, red large light emitting diode:

a. Silence push button, which disables the audible alarm, shall be accessible on the front of the safety monitor.
b. Provide alternate mode in which audible alarm is silenced indefinitely but visual alarm remains activated until the alarm condition is corrected.
c. When alarm condition is corrected and face velocity and volume return to specified levels, the safety monitor will automatically reset and begin routine monitoring.

5. Provide test circuit to verify proper safety monitor operation.
6. Electrical rating: Maximum 12 VDC, and maximum current rating of 200MA.

2.4 BYPASS TYPE FUME HOODS

A. Constant volume type with built in automatic compensating bypass to maintain constant exhaust volume regardless of sash position.

B. Bypass: Positive in action and controlled by the sash operation.

C. Low impedance, directionally louvered panel provided in the lintel bypass area and one inch bypass provided immediately above the work surface and directly below the bottom horizontal sash rail. Designs which require all bypass to enter hood over front solid panel-not acceptable.

D. As sash is lowered, bypass design shall limit the increase in face velocity to maximum of four times the average face velocity with the sash full open.

E. Sash: Vertical-rising

F. Width: 60 inches.

2.5 METAL FINISH

A. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pretreat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.

B. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade furniture quality finish of the following thicknesses:
1. Exterior and interior surfaces exposed to view: 1.5 mil average and 1.2 mil minimum.
2. Backs of cabinets and other surfaces not exposed to view: 1.0 mil average.

2.6 SOURCE QUALITY CONTROL TESTING OF FUME HOODS

A. Evaluation of manufacturer's standard product shall take place in manufacturer's own test facility, with testing personnel, samples, apparatus,

instruments, and test materials supplied by the manufacturer at no cost to the Owner.

B. Submit test report consisting of the following test parameters and equipment for each hood width and configuration specified.

C. Hood shall achieve a rating of 4.0 AM 0.1 P.P.M. or better. Tested to ASHRAE-110-R.

D. Test facility: Sufficient size to provide unobstructed clearance of five feet each side and ten feet in front of fume hood. Provide make-up air to replace room air exhausted through fume hood and to obtain a negative 0.2 inches w.g. room pressure. Introduce make-up air in a manner that minimizes drafts in front of hood to less than 20 percent of the face velocity. Connect 100 feet per minute air velocity through face of fume hood. Adjustment in blower shall vary face velocity down to 75 feet per minute.
   1. Examine facility to verify conformance to the requirements of this Section.
   2. Test room shall be isolated from all personnel during test procedure.

E. Testing equipment:
   1. Properly calibrated hot wire thermal anemometer probes equal to Sierra Model 600-02; correlate with computer data acquisition format to provide simultaneous readings at all points.
   2. Pitot tube and inclined manometer with graduations no greater than 0.2 inches of water, equal to F.W. Dwyer Model 400. Calibration curves based on 20. Pitot traverse readings and correlated to a digital readout indicator to provide quick and accurate adjustment of air flows.
   3. Tracer gas: Sulfur hexa-fluoride supplied from a cylinder at a test flow rate of four liters per minute.
   4. Ejector system: Tracer gas ejector equal to IHE No. 525-014. Submit sufficient proof of ejector system calibration.
   5. Critical orifice: Sized to provide tracer gas at four liters per minute at an upstream pressure of 30 PSIG.
   6. Detection instruments: Ion Track Model 61 Leak Meter II sulfur hexafluoride detector instrument.
   7. Recorder with an accuracy better than plus or minus 0.5 percent of full scale.
   8. Three dimensional manikin, overall height 67 inches, clothed in a smock.
   9. Titanium tetrachloride glass modules. CAUTION: Titanium tetrachloride is corrosive and irritating; skin contact or inhalation shall be avoided.
   10. One dozen 30-second smoke bombs.

F. Preliminary Test and Data:
   1. Provide sketch of room indicating room layout, location of significant equipment, including test hood and other hoods. Provide sketch of air supply system indicating type of supply fixtures.
   2. Reverse air flows and dead space:
      a. Swab strip of titanium tetrachloride along both walls and floor of hood in a line 6 inches behind and parallel to the hood face, and along the top of the face opening. Swab an 8 inch diameter circle

on the back of the hood. All smoke should be carried to the back of the hood and exhausted.

b. Test the operation of the bottom air bypass air foil by running the cotton swab under the air foil.

c. If visible fumes flow out of the front of the hood, the hood fails the test and receives no rating.

3. Face velocity measurements: Face velocity shall be determined by averaging minimum of four and maximum of eight readings at the hood face. Take readings at center of a grid made up of sections of equal area across the top half of the face and sections of equal area across the bottom half of the face. Take simultaneous readings at each point with a series of calibrated hot wire anemometers over a one minute period of time. Probes shall be correlated to a computer data acquisition package, which will provide an average of each reading over that one minute period and also an overall average. During the one minute monitoring period, all velocities must automatically update average at a maximum of four second intervals.

G. Test Procedure:

1. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up or down. Position sash in the full open position.
2. Measure exhaust air flow with the baffles' position to give maximum air flow. Measure exhaust air volume with baffles' position to give minimum air flow. Verify that the air volume at minimum air flow is not less than 95 percent of the exhaust air volume at maximum air flow. Hoods exceeding this fail the test and receive no rating.
3. Take a static pressure reading, using methods assuring an accurate reading, in an area of the ductwork no more than three feet nor less than one foot above the exhaust collar. Static pressure loss shall not exceed values given under Design Requirements in PART 1 of this Section.
4. Install ejector in test positions. For a typical bench-type hood, three positions are required: left, center and right as seen looking into the hood. In the left position the ejector center line is 12 inches from the left inside wall of the hood; center position is equal distance from the inside sidewalls; and the right position is 12 inches from the right inside wall. The ejector body is 6 inches in from the hood face in all positions. Location of ejector may require modification for hoods of unusual dimensions.
5. Install manikin positioned in front of the hood, centered on the ejector.
6. Fix detector probe in the region of the nose and mouth of the manikin. Take care that method of attachment of the probe does not interfere with the flow patterns around the manikin. Locate nose of manikin 9 inches in front of ejector (3 inches in front of sash).
7. Open tracer gas block valve. Correlate readings with a computer data acquisition package, which is capable of monitoring and visually recording a minimum of one reading per second for a minimal three minute time period at each of the three positions.
8. The control level rating of the hood shall be the maximum of the three average values for the three test positions.

9. Record performance rating of the fume hood as XXAMyyy, where XX equals the release rate in liters per minute (4.0) and AM represents the as manufactured test sequence and yyy equals the control level in parts per million.
10. All data on the above test conditions including instrumentation and equipment, test conditions, preliminary test and data information shall be provided on a one page report, including a printout of the average face velocities, and a separate graph-type performance curve on all three tracer gas positions.

H. Constant Volume/Bypass and VAV/Conventional Fume Hoods:
1. Conduct test as outlined above with the sash open.
2. Ignite a smoke bomb within the fume hood work area to verify that the fumes are quickly and efficiently carried away. Move the lighted bomb about the fume hood work area, checking near fume hood ends and work surface to verify that there is no reverse flow of air at these locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation:
1. Install fume hoods and equipment in accordance with manufacturer's instructions.
2. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

B. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations.

3.2 ADJUSTING

A. Repair or remove and replace defective work, as directed by [Architect] [Owner] upon completion of installation.

B. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

3.3 CLEANING

A. Clean equipment, touch up as required.

3.4 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of equipment from exposure to other construction activity.

B. Advise contractor of procedures and precautions for protection of material and installed fume hoods from damage by work of other trades.

END OF SECTION 11 53 13

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Motor-operated roller shades with single rollers and with double rollers.

B. Related Requirements:
   1. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
   2. Section 07 92 00 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
   1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.

D. Roller-Shade Schedule: Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material, signed by product manufacturer.

C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Draper Inc.
   2. Hunter Douglas Contract.
   3. Lutron Electronics Co., Inc.
   4. MechoShade Systems, Inc.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUAL-OPERATED, SINGLE-ROLLER SHADES

A. Manual Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with end band and applicable grasp for operation as well as enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction.

1. Crank-Operator Override: Crank and gearbox operate shades in event of auto-retract failure.
2. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
3. Operating Features:
   a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.
   b. Capable of interface with audiovisual control system.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Roller Drive-End Location: As indicated on Drawings.
   2. Direction of Shadeband Roll: Regular, from back of roller.
   3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers that are operated by one roller drive-end assembly.

E. Shadebands:
   1. Shadeband Material: Light-filtering fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: TBD.

F. Installation Accessories:
   1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
      a. Shape: L-shaped.
      b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open, but not less than 3 inches (76 mm).
   2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
      a. Height: Manufacturer's standard in height required to enclose roller and shadeband when shade is fully open, but not less than as indicated on Drawings.
   3. Endcap Covers: To cover exposed endcaps.
   4. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.

a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than height indicated on Drawings.
b. Provide pocket with lip at lower edge to support acoustical ceiling panel.

5. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
   a. Closure-Panel Width: As indicated on Drawings.
6. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
7. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
8. Installation Accessories Color and Finish: TBD.

2.3 MOTOR-OPERATED, SINGLE-ROLLER SHADES

A. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
   1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Electric Motor: Manufacturer's standard tubular, enclosed in roller.
   3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
      a. Individual/Group Control Station: Momentary-contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for individual and group control.
      b. Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features; isolated from voltage spikes and surges.
      c. Color: TBD.
   4. Crank-Operator Override: Crank and gearbox operate shades in event of power outage or motor failure.
   5. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
   6. Operating Features:
      a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.
      b. Capable of interface with audiovisual control system.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights

and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: As indicated on Drawings.
2. Direction of Shadeband Roll: Regular, from back of roller.
3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers that are operated by one roller drive-end assembly.

E. Shadebands:
1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
   a. Type: Enclosed in sealed pocket of shadeband material.
   b. Color and Finish: TBD.

F. Installation Accessories:
1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
   a. Shape: L-shaped.
   b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open, but not less than 3 inches (76 mm).
2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
   a. Height: Manufacturer's standard in height required to enclose roller and shadeband when shade is fully open, but not less than as indicated on Drawings.
3. Endcap Covers: To cover exposed endcaps.
4. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
   a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than height indicated on Drawings.
   b. Provide pocket with lip at lower edge to support acoustical ceiling panel.
5. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
   a. Closure-Panel Width: As indicated on Drawings.
6. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.

7. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
8. Installation Accessories Color and Finish: TBD.

2.4 MOTOR-OPERATED, DOUBLE-ROLLER SHADES

A. Motorized Operating Systems: Provide factory-assembled, shade-operator systems of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
   1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Electric Motor: Manufacturer's standard tubular, enclosed in rollers.
   3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
      a. Individual/Group Control Station: Momentary-contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for individual and group control.
      b. Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features; isolated from voltage spikes and surges.
      c. Color: TBD.
   4. Crank-Operator Override: Crank and gearbox operate shades in event of power outage or motor failure.
   5. Limit Switches: Adjustable switches, interlocked with motor controls and set to stop shade movement automatically at fully raised and fully lowered positions.
   6. Operating Features:
      a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.
      b. Capable of interface with audiovisual control system.
      c. Override switch.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shades for service.
   1. Double-Roller Mounting Configuration: Offset, outside shade over and inside shade under.
   2. Inside Roller:
      a. Drive-End Location: As indicated on Drawings.
      b. Direction of Shadeband Roll: Regular, from back of roller.
   3. Outside Roller:
      a. Drive-End Location: As indicated on Drawings.
      b. Direction of Shadeband Roll: Regular, from back of roller.

4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller mounting configuration, roller assemblies, operating mechanisms, installation accessories, and installation locations and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Inside Shadebands:
1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
a. Type: Enclosed in sealed pocket of shadeband material.
b. Color and Finish: TBD.

F. Outside Shadebands:
1. Shadeband Material: Light-blocking fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
a. Type: Enclosed in sealed pocket of shadeband material.
b. Color and Finish: TBD.

G. Installation Accessories:
1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
a. Shape: L-shaped.
b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open, but not less than 3 inches (76 mm).
2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than as indicated on Drawings.
3. Endcap Covers: To cover exposed endcaps.
4. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than height indicated on Drawings.
b. Provide pocket with lip at lower edge to support acoustical ceiling panel.
5. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recesses or pockets and for snap-in attachment to wall clip without fasteners.
a. Closure-Panel Width: As indicated on Drawings.
6. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with

shadeband guides or other means of aligning shadebands with channels at tops.

7. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
8. Installation Accessories Color and Finish: TBD.

2.5 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
1. Source: Roller-shade manufacturer.
2. Type: TBD.
3. Weave: TBD.
4. Thickness: TBD.
5. Weight: TBD.
6. Roll Width: TBD.
7. Orientation on Shadeband: As indicated on Drawings.
8. Openness Factor: TBD percent.
9. Color: As indicated on Drawings.

C. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.
1. Source: Roller-shade manufacturer.
2. Type: TBD.
3. Thickness: TBD.
4. Weight: TBD.
5. Roll Width: TBD.
6. Orientation on Shadeband: As indicated on Drawings.
7. Features: TBD.
8. Color: As indicated on Drawings.

2.6 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:
   1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
   2. Skylight Shades: Provide battens and seams at uniform spacings along shadeband as required to ensure shadeband tracking and alignment through its full range of movement without distortion or sag of material.
   3. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

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

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
   1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer,that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13

SECTION 12 35 53 - LABORATORY CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The subsequent specifications are designed to describe to the provider of the laboratory furniture system the standards and expectations that the owner and architect allow for a quality and functional installation of the laboratory furniture.

B. Laboratory Furniture: Provide and install all wood and metal laboratory furniture, benches and fume hoods; which includes but is not limited to; wood furniture, metal furniture, countertops, reagent shelves, fume hoods, tables, standards, slotted studs, filler panels, scribes, knee space panels, accessories, utility space framing, utility space closure panels between base cabinets and at exposed ends of utility spaces, laboratory sinks, cup sinks, cup drains, strainers, overflows and sink outlets and miscellaneous items of equipment as listed in the specifications or as shown on drawings. Work includes all laboratory furniture depicted on drawings or listed in these specifications unless otherwise noted as "not in contract" (NIC) within the drawings, equipment schedule or said specifications.

C. Related Sections include the following:
   1. Section 06 40 23 - Interior Architectural Woodwork.
   2. Section 11 53 13 - Fume Hoods.
   3. Section 15 40 00 - Plumbing.
   4. Related Work to be Performed by Others:
      a. Final installation of all plumbing, service and electrical fixtures attached to furniture or countertop (excluding piping and wiring within fume hoods).
      b. Final connection to service lines of all plumbing, service and electrical fixtures attached to laboratory furniture or furniture.

1.3 REFERENCE STANDARDS

A. Architectural Woodwork Quality Standards Illustrated. Eighth Edition, Version 1.0. Virginia: 2003. Architectural Woodwork Institute

B. ANSI/Hardwood Plywood Veneer Association Manual Version ANSI/HPVA HP-1-2009

C. All casework, work surface and service fixture construction and performance characteristics shall be in full compliance with SEFA (Scientific Equipment and Furniture Association) standards. At the owner's request, independent, third

party testing must be submitted validating compliance and adheres to the architectural specifications.

1. SEFA 2.3 - Installation of Scientific Laboratory Furniture and Equipment.
2. SEFA 3 - Work Surfaces
3. SEFA 7 - Laboratory and Hospital Fixtures
4. SEFA 8 - Laboratory Furniture

1.4 DEFINITIONS:

A. "Barrel Hinge" is a hinge composed of two plates attached that are attached to abutting surface.

B. "Chamfer Edge" is an edge treatment for edge banding where a 45 degree planning is applied to the edge at 1mm in a clean crisp manner. All edges on door, drawer and applied accent faces shall be treated in that manner for the entire project when listed.

C. "CARB" refers to the California Air Resources Board. Carb1 and Carb2 describe the amounts of allowable off-gassing of various chemicals used in production of panel products.

D. "Concealed hinge" is any hinge that has no components visible from the outside of the cabinet.

E. "Concealed Portions of Furniture" surfaces that are not visible after installation; Bottoms of cabinets are less than 30 inches above finished floor; Tops of cabinets are 72 inches or more above finished floor (and are not visible from an upper level); Stretchers, blocking and/or components are concealed by drawers; Corners are created by tall, wall, or base cabinets and shall be non- accessible.

F. "Eased" is a process of providing a slight radius on door and drawer fronts of a cabinet.

G. "Exposed surfaces" are surfaces that are visible when: Drawer fronts and doors are closed; Cabinets and shelving are open or behind clear glass doors; Bottoms of cabinets are seen 48 inches or more above the finished floor; Tops of cabinets are seen below 72 inches above finished floor, or are visible from an upper floor or raised area after installation

H. "False Fronts" are nonfunctional fronts attached to particular units that mimic drawer box fronts to create an uninterrupted visual image of an elevation.

I. "Flush Inset" occurs when doors and drawer faces are inset within the side members of the cabinet in the same plane.

J. "Flush Overlay" is furniture design that requires the AWI reveal of 1/8 inch between all individual door and drawer components within a cabinet and within an elevation.

K. "Laboratory Furniture Contractor/Manufacturer" is defined as the manufacturer and/or manufacturer's representative that is to provide and install the laboratory furniture, equipment, and accessories listed under the specifications, laboratory equipment schedule and/or illustrated on drawings.

L. "Pure square edge" is an exact 90 degree angle at the edge of the door and drawer front. Pure square edge requires the addition of adjusting hardware within the drawer head to align the individual cabinets in an elevation.

M. "Reveal" is the measurement between individual door and drawer components on the face of a cabinet.

N. "Semi-exposed" surfaces that are visible when: Opaque doors are open or drawers are extended; Bottoms of cabinets more than 30 inches and less than 42 inches above finished floor.

O. "Service Fixtures" are laboratory gas, air, and vacuum cocks; hot, cold and reagent water faucets; remote control valves, electrical receptacles (with necessary flush mounting hardware), fluorescent and/or incandescent light fixtures , light switches and/or motor switches for fume hoods and other items which serve as an operational part of the equipment.

P. "Service Lines" are the necessary piping and drain lines for laboratory gas, air and vacuum as well as hot, cold and reagent grade water that conveys the respective services from building roughing through floors or walls through equipment to the previously defined service fixtures. Also includes conduits, junction boxes, conduit fittings, wire disconnect switches and fuse or circuit breakers necessary to conduct electrical services from building roughing in floors or walls through equipment to service fixtures.

Q. "Zone matching" is a process of sorting veneer faces to an aesthetically pleasing range for the purpose of maintaining aesthetic quality within the manufacturing process.

1.5 SYSTEM DESCRIPTION

A. Cabinet and Furniture Area Design:
1. Offset flush overlay with 1/8 inch reveal between intra-cabinet doors and drawers and 9/32 inch plus/minus reveal at cabinet edge for offset of the selected hinge around the door.
2. Veneer grain on doors and drawers shall be vertical matching per drawer-door set minimum.
3. Doors and drawer fronts are to be slightly eased at all edges.
4. One eighth inch (3mm) Red oak roll edge banding will be used for all banded edges.
5. All shelving for open shelves will be edge banded all four sides.

1.6 SUBMITTALS

A. Product Data and Details: Drawings should include data and details for construction of the laboratory furniture as well as information regarding the

name, quantity, type and construction of materials (such as hardware, gauges, etc), that will be used to complete the project.

B. Shop Drawings: The laboratory furniture manufacturer shall furnish shop drawings illustrating the layout and placement of all laboratory furniture and fume hoods as well as any products listed above under SUMMARY.
   1. Provide 1/2" = 1'-0" scale elevations of all components, cross sections, rough-in and anchor placements, tolerances and clearances. Provide 1/4" = 1'-0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.
   2. The furniture manufacturer is responsible for identifying any deviation in dimension, material, detail, or other aspect of the project that is not concurrent with the contract documents. Any deviation not made apparent will be deemed as "not reviewed", and will have to be altered even if not recognized during the approval phase.
   3. Field Measurements: In instances in which furniture is indicated to fit to other construction, dimensions shall be verified by field measurements before fabrication and reflected on shop drawings.
   4. The manufacture or purchase of any equipment prior to approval by the Owner's representative will be undertaken at the manufacturer's risk.

C. Samples: Laboratory furniture provider shall submit, preceding the construction of the specified mock-up, the following samples for approval by the Owner's representative.
   1. One (1) 24 inch wide, full-height base cabinet: Construction to consist of one (1) drawer, one (1) door, one (1) cupboard with adjustable half/full depth shelf and related hardware (pulls, hinges, drawer slides, etc.), complete with finish.
   2. One 36 inch wide x 36 inch high wall cabinet: Construction to consist of two adjustable shelves as well as related hardware and doors, complete with finish.
   3. Stain and Finish Samples
      a. A minimum of ten (10) standard manufacturer's samples, constructed of the same material from which the furniture will be constructed, stained and clearly identified, should be submitted to the architect for color selection.
      b. Stain and finish samples will be retained by the owner's representative.
   4. Provide color selection charts from manufacturer's standard colors.

D. Quality Assurance/Control Submittals
   1. Design Data/Test Reports: Manufacturer shall submit test data and design criteria which are in compliance with the project specifications. Testing of safety devices and performance criteria shall be performed by a third party validator.
   2. Certificates: All certifications required in the specifications should be submitted with the original submittal package under separate cover. Certificates must be provided with the signature of a qualified individual of the supplier.
   3. Manufacturers' Instructions: Provide manufacturer's instructions for installation and maintenance of all products provided and installed within

this section. Instructions should be in bound form, tabbed and organized by section number. Instruction:

a. Submit for review and approval written instructions in booklet form providing additional details on safe and proper operation and maintenance.

1.7 QUALITY ASSURANCE

A. Qualification of Bidder/Manufacturer: The following list of information shall be provide to the Architect at least ten (10) days prior to the bid opening:
   1. List of manufacturing facilities;
   2. Five years or more experience in manufacture of laboratory casework.
   3. A list of ten (10) installations of comparable stature completed within the past 5 years;
   4. Construction details depicting the materials, sizes and methods of construction.
   5. Independent laboratory test reports that include information on cabinet, fume hood and table top finish and performance that have been conducted within the last two years.

B. Basis of Design: The ensuing specifications are based on the design of Mott Manufacturing; Series Red Oak wood furniture.

C. Source Limitations: Laboratory furniture, including countertops, sinks, service fittings and accessories, shall be manufactured or furnished by a single laboratory furniture company.

D. Mock-Ups: Area mockups shall be as indicated on the shop drawings. Mockup areas must be priced for disassembly and reassembly and used within the project

1.8 DELIVERY, STORAGE AND HANDLING

A. Packaging, Shipping, Handling and Unloading
   1. Packaging: Products should have packaging adequate enough to protect finished surfaces from soiling or damage during shipping, delivery and installation.
   2. Delivery: Furniture delivery should only take place after painting, utility rough-ins and related activities are completed that could otherwise damage, soil or deteriorate furniture in installation areas. Schedule delivery of laboratory furniture system so that spaces are sufficiently complete that material can be installed immediately following delivery.
   3. Handling: Care, such as the use of proper moving equipment, experienced movers, etc., should be used at all times to avoid damaging the furniture. Until installation takes place, any wrapping, insulation or other method of protection applied to products from the factory should be left in place to avoid accidental damage.
   4. Protect finished surfaces from soiling or damage during handling and installation.

B. Acceptance at Site: Furniture will not be delivered or installed until the conditions specified under PART 3, Installation section of this document have been met.

C. Storage: Furniture should be stored in the area of installation. If, prior to installation, it is necessary for furniture to be temporarily stored in an area other than the installation area, the environmental conditions shall meet the environmental requirements specified under the Project Site Conditions article of this section.

D. Waste Management and Disposal: The supplier of the laboratory furniture is responsible for removing any waste or refuse resulting from the installation of, or work pertaining to laboratory furniture; thereby leaving the project site clean and free of debris. Trash containers to be provided by others.

1.9 PROJECT SITE CONDITIONS

A. Do not deliver or install furniture and equipment until the following conditions have been met:
   1. Building must be enclosed (windows and doors installed and building weather-tight).
   2. An operational HVAC system that maintains temperature and humidity at 50 percent relative humidity plus or minus 15 percent and temperature 72 degrees Fahrenheit plus or minus 5 degrees in all areas of the building. Uncontrolled acclimatization will not be allowed. The use of temporary heat is not allowed under any circumstances due to imminent damage to panel products produced with environmentally friendly adhesives. The use of temporary cooling is allowed to the extent that adequate control of both temperature and humidity is in effect.
   3. Ceiling, overhead ductwork and lighting must be installed;
   4. Site must be free of any further "wet work" construction such as tiling.
   5. Floor finishes have been installed.
   6. Required backing and reinforcements must be installed accurately and the project must be read for furniture installation.

1.10 WARRANTY

A. Furnish a written warranty that Work performed under this Section shall remain free from defects as to materials and workmanship for a period of one (1) year from date of acceptance. Defects in materials and workmanship that may develop within this time are to be replaced without cost or expense to the Owner. Defects include, but are not limited to:
   1. Ruptured, cracked, or stained coating
   2. Discoloration or lack of finish integrity
   3. Cracking or peeling of finish
   4. De-lamination of components or edge banding
   5. Slippage, shift, or failure of attachment to wall, floor, or ceiling
   6. Weld or structural failure (visible weld marks)
   7. Warping or unloaded deflection of components
   8. Failure of hardware

9. Adherence to paragraph 1.9 PROJECT SITE CONDITIONS, must be followed for warranty to be in effect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. The intent of this specification is to define a level of craftsmanship necessary to provide for the owner and architect a well-designed and quality system of laboratory furniture. Only materials and/or products that are in accordance with the requirements will be acceptable. Bidders who propose to provide any product which deviates from the standards listed herein must describe in writing the instances in which the equipment differs from the specifications; and must obtain written approval to bid an alternate from the architect a minimum of 10 days prior to the bid date. Any bid that fails to be expressed as an alternate will be interpreted as an offer to design, construct and provide products based on the specifications outlined in this text.

B. Approved Manufacturer(s)/Brand of Wood Furniture: All furniture shall be the product of one of the below manufacturers or approved equals. Other suppliers will be considered only with the provisions that the products are submitted for approval within the dates specified within the pre-approval process and remain in compliance with the standards of material, construction, finish and performance identified in these specifications.
1. Mott Manufacturing
2. Sheldon Laboratory Systems
3. Campbell-Rhea.

2.2 MATERIALS

A. Laboratory Furniture:
1. Solid Lumber Used:
a. All hardwoods shall be carefully and thoroughly air-dried, and then kiln dried to a moisture content of 6-9 percent before use.
b. All exterior wood furniture surfaces exposed to view after installation, exposed exterior ends and tops and bottoms of open cases or cases having glazed doors; shall be plain sliced Red oak. Provide Grade 1 "firsts and seconds"
c. The solid woods used for all surfaces exposed to view after completion of installation shall be clear, with color and graining to aesthetically match the adjacent veneer surfaces.
d. All interior parts fabricated of hardwood shall be plain sliced Red oak. Grade 1.
2. Exposed Veneer
a. Veneer used for exterior surfaces exposed to view after installation, and the exposed interior ends, tops and bottoms of open cases shall be constructed of Grade A (with modifications to grade) , plain sliced Red oak, book matched of at least 1/45 inch thick.

b. Deviations and clarifications of ANSI/HPVA standards.
   1) Color, Matching, Fabrication. 100 percent heartwood, wheat in color.
   2) Manufacturing Characteristics. Rough cut or ruptured grain is not allowed and repairs must be blended so as not to detract from the aesthetic appearance of the exposed cabinet part.

3. Semi-Exposed Veneer:
   a. Veneer faces used for semi-exposed areas shall be constructed of plain sliced Red oak, component faces, grade 2, either plain sliced or rotary sliced, random matched.
   b. Interior shelves shall be banded with 1/8 inch plain sliced Red oak hardwood on front edge.
4. Plywood Core Construction for Furniture Body, Interior shelving, Wall shelving. All 3/4 inch plywood panels shall be constructed as 7 ply combination core hardwood plywood with composite crossbands. 1 inch panels shall be constructed as 9 ply combination core hardwood plywood with composite crossbands. All face and back (exposed and semi exposed) panels must be produced from domestic sources, import panels are not allowed for any exposed/semi exposed surfaces. Import panels can be used on semi to unexposed or unexposed to unexposed surfaces except that construction must not exceed the 7 ply standard herein. Panels either domestic or import that exhibit ply construction either above or below the specific ply listed will be rejected. All panels shall be manufactured without the use of added urea formaldehyde. The panel will be manufactured in a two step process wherein the five ply core is processed, sanded smooth, calibrated and the veneer is applied to a sanded core and shop sanded to a minimum of 180 grit. The finished panel will have a thickness tolerance plus or minus .5mm. Plywood used for all shelving shall be 9 ply 1 inch hardwood plywood constructed in the same manner as the 3/4 inch plywood.
5. Plywood Core Construction for Doors/Drawer Heads/Applied Panels: All 3/4 inch plywood panels shall be constructed as 3 ply M2 particleboard. All face and back (exposed and semi exposed) panels must be produced from domestic sources, import panels are not allowed for any exposed/semi exposed surface. All panels shall be manufactured without the use of added urea formaldehyde. The panel will be manufactured in a two step process wherein the inner core is processed, sanded smooth, calibrated and the veneer is applied to a sanded core and shop sanded to a minimum of 180 grit. The finished panel will have a thickness tolerance plus or minus .5mm.
6. Hardware and Trim:
   a. Door and Drawer Pulls: Shall be modern design, offer a comfortable hand-grip and be securely fastened to doors and drawers with screws. All pulls shall be chrome wire type with 4 inch centers and without escutcheons. Two pulls shall be required on all drawers over 24 inches wide. Use of plastic pulls (molded or extruded), or a design not compatible for usage by handicapped will not be acceptable.
   b. Flush Pulls: For sliding doors, pulls shall be satin finish chrome, providing a recessed finger grip. Finger holes or slots machined into doors will not be acceptable.

c. Hinges: Shall be five (5) knuckle 2.75 inch Grade 1 Type 304 stainless steel for all hinged doors. Two hinges for doors less than 4 feet in height and three hinges on doors over 4 feet. in height.

d. Locks:

1) Furniture drawers and hinged doors: Shall be provided when indicated by the specified product number, shown on the drawings or called for in the furniture schedule. Exposed surface of locks shall be dull chrome. All locks, for the purpose of coordinating keying systems, shall be National five (5) tumbler. Provide with Master keys.

2) Framed Glass Doors: Locks shall be plunge type sliding showcase locks of the same make as those selected above.

3) Sliding Glass Doors: Locks shall be ratchet type sliding showcase locks of the same make as those selected above.

7. Door Catches:

a. Roller Catches: Shall be used on all hinged doors. Catches shall have a spring-loaded dual polyethylene roller and are provided with a steel strike plate. Double doors without locks shall have a catch on each door. Tall cases shall have latching devices located on upper and lower part of each door. On cabinets equipped with locks, the left-hand door shall have a positive catch and the right hand door shall have roller type catch.

1) Elbow Catches: Catches and strike plates shall be used on left hand doors of double door cases where locks are used, and shall be steel, cadmium plated.

8. Drawer Slides: Drawer slides for standard drawers shall be grade 100 pound, 3/4 extension ANSI/BHMA Grade 1, TFS model #5000. Slides for file drawers, heavy-duty paper storage drawers and any drawers shall be Grade 1, 150 pound full extension TFS # 9677.

9. Leg Shoes: Shall be provided on all table legs, unless otherwise specified, to conceal leveling device. Shoes shall be 2 1/2 inches high and constructed of pliable, ABS plastic. Use of a leg shoe which does not conceal leveling device will not be acceptable.

10. Tote Trays: Shall be tan color vacuum-formed plastic type with full top rim in standard sizes. Each tote tray is equipped with plated steel label holder.

11. Coat Rods: Shall be KV #770 chrome plated 1 inch diameter steel with KV #764 rod flanges (or approved equivalent).

12. Support Struts: Shall consist of two 16 gauge channel uprights fastened top and bottom by two adjustable "U" shaped spreaders, each 1/8 inch by 1 1/2 inches by length required. Struts can be furnished to support fume hood superstructures or other abnormal loads when required. Support struts shall be finished with a black, enamel paint.

13. Shelf Support Clips: Shall be plastic twin pin seismic type, for mounting on interior of cabinets. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves are adjustable on 32 mm centers.

14. Tempered Hardboard: Wood-fiber and resin combination formed with heat and pressure into a hard, smooth surface.

B. Special Materials
1. Fiberglass Reinforced Polyester: Reinforced polyester panels for laboratory use specifically designed to be corrosion and flame resistant lining for fume hoods and certain acid storage units. Exposed surface shall be smooth in appearance and white in color. Material has a flexural strength of 19,500 PSI and water absorption of 0.2 percent.
2. Glass:
   a. Glass for framed and unframed doors shall be 1/4 inch thick clear laminated safety glass, complying with ASTM C1172, Kind LT, Condition A, Type 1, Class 1.
   b. Glass used in fume hood sashes or other equipment used in hazardous areas shall be 7/32 inch thick laminated safety float type. Fluorescent light shielding in fume hoods shall be tempered glass offering greater resistance to heat and impact.

C. Special Units:
1. Acid Storage Base Cabinet: Cabinet exterior is to match type of wood, stain, color and finish of adjacent cabinetry but is to be lined with corrosion resistant material equal to the fiberglass reinforced polyester described in the "Special Materials" section of this document. Venting, if required, is to be accomplished through the use of a PVC cent pipe through the back of the cabinet.
2. Flammable Cabinet: Cabinet exterior is to match type of wood, stain, color and finish of adjacent cabinetry but is subject to the following differences:
   a. Inset Overlay: Doors are set within the members of the frame to allow for the creation of a near airtight seal when closed. Reveals reflect panel width and are 1 inch around the entire face of the cabinet.
   b. NFPA 30 Compliant/UL listed: Cabinet is constructed to limit the internal temperature at the center of the cabinet and 1 inch from the top of the cabinet to no more than 325 degrees Fahrenheit when subjected to a 10 minute test that simulates fire exposure. All joints and seams are designed to remain tight and the door shall remain securely closed for the duration of exposure to flame/heat of the same duration of the test.
   c. Exposed Plywood
      1) Properties pertaining to plywood used for exterior surfaces and doors remain consistent with the properties already specified under the Exposed Plywood section of Laboratory Furniture with the following exception: The plywood used for exterior surfaces and doors must be constructed from 1 inch plywood as opposed to a 3/4 inch thick material.
   d. Hardware and Trim:
      1) Door Pull and Catch: Door pulls and catches shall be part of an integrated 3 point latching system that offers a comfortable hand-grip and be is securely fastened to doors with zinc screws.
      2) Hinges: Full-length piano style hinge.

e. Cabinet Construction:

1) Cabinet end panels, top, bottom and back shall be 1 inch, 9 ply plain sliced Red oak plywood meeting the same veneer quality requirements as indicated in Section 1.2A.2.with 1/8 inch hardwood edgebanding. The entire structure including end panels, top, bottom and back shall be of rabbet joint construction with each joint secured from two directions with countersunk screws affixed to hardwood blocking from the interior of the cabinet. The unit will be equipped with gasketing and a keyed astragal to totally seal the interior of the cabinet from the outside. All base units shall have a removable drip tray recessed within the blocking capable of retaining a 2 inch depth of spilled liquid.

2) Doors: Doors shall be fabricated using 1 inch solid plywood core. All four showing edges shall be edge banded with 1/8 inch hardwood. Piano hinges will be attached via zinc screws to the interior of the cabinet.

2.3 FABRICATION

A. Open-Leg Tables: Legs shall be one piece plain sliced Red oak hardwood construction, 2 1/4 inches square with all corners eased slightly. Legs shall be secured to the apron frame by a heavy duty corner bolt and a 16 gauge metal corner brace. Corner braces shall be locked into apron rails by accurately located grooves and shall be securely fastened with screws. All apron rails shall be 3/4 inch thick solid plain sliced Red oak hardwood. Leg stretchers, where required, shall be 3/4 inch by 3 inches utilizing an 8 mm dowel with a countersunk #10 screw assembled into the legs and secured with a 4 inch long thru-bolt.

B. Base Cabinets (Hinged Door and Drawer):

1. Cabinet end panels shall be 3/4 inch plain sliced Red oak plywood with 1/8 inch by 3/4 inch plain sliced Red oak hardwood face.
2. Unexposed cabinet backs shall be 1/4 inch thick tempered hardboard. Cupboard, sink and fume hood units shall be provided with removable back panels allowing access to plumbing chase. Back panels in cupboards shall be removable without the use of hand tools or fasteners; sink and fume hood base cabinets shall be provided with 12 inch high removable back attached with 5/8 inch screws and washers. Backs are not provided for drawer bank cabinets. Backs behind solid panel doors shall be 1/4 inch tempered hardboard. Backs behind glass doors shall be 1/4 inch plywood of same species, grade and grain orientation as cabinets.
3. Cabinet backs exposed to view as finished backs shall be 3/4 inch plain sliced Red oak hardwood plywood in grade as listed in paragraph 2.2.A.2.
4. Cabinet bottoms shall be 3/4 inch plywood. All base units less than 36 inches wide shall have full-depth adjustable shelves, 3/4 inch thick plywood with 1/8 inch Red oak edge banding on exposed front edge. Adjustable shelves for cabinets over 36 inches wide shall be 1 inch thick.
5. Furniture toe space shall 3/4 inch hardwood plywood, 3 1/2 inches deep x 4 inches high.

6. Web Frames:
   a. Components
      1) Top Horizontal:
         a) Front rail 2 1/4 inches x 1 inch solid hardwood with banding to match 1.5.A.5
         b) Side and rear rails 2 1/4 inches x 1 inch hardwood, any species.
      2) b. Intermediate Horizontal:
         a) Front rail 2 1/4 inches x 1 inch solid hardwood with banding to match 1.5.A.5
         b) Rear rail 2 1/4 inches x 1 inch solid hardwood, any species. Required with security panels.
      3) Doors and Drawer Fronts: Doors and drawer fronts shall be fabricated using 3/4 inch plain sliced Red oak. All four showing edges (if not lipped or bull nose construction), shall be edge banded with 1/8 inch plain sliced Red oak hardwood.

C. Drawer Boxes: Shall be fabricated of 1/2 inch solid birch, 9 ply birch or maple plywood with dovetail joints all four corners. Drawer bottoms shall be 1/4 inch tempered hardboard, set and glued into 1/4 inch grooves on all four sides. Drawer heads shall be replaceable in case of damage. Drawer heads shall be attached to the drawer boxes with wood screws.

D. Tall Sliding Door Cases: Cases shall be designed and integrally constructed for full enclosure. All exposed woods shall be plain sliced Red oak. All end panels shall be 3/4 inch thick plain sliced Red oak plywood with a 1/8 inch by 3/4 inch plain sliced Red oak edgebanding. Tops for open or glazed door cases shall be 1 inch thick plain sliced Red oak plywood, doweled into end panels, secured with glue and countersunk screws. The top in solid door cases shall be 1 inch thick plain sliced Red oak plywood with 3/8 inch x 2 inch plain sliced Red oak hardwood faces applied to conceal the overhead sliding-door suspension system. Double extruded aluminum track shall be attached to the case top for the sliding door suspension system.
   1. All doors shall be suspended from an adjustable hanger and glide on nylon roller wheels. A nylon retainer is located on the case bottom. Panel doors shall be fabricated using 3/4 inch thick with all four edges edge banded with plain sliced Red oak veneer. Wood framed glazed doors shall have 3/4 inch x 3 inch hardwood plain sliced Red oak framing. Glass shall be set into door frames and secured with an extruded neoprene retainer machined to eliminate movement of the glass panel. Shelves shall be 1 inch plain sliced Red oak plywood with 1/8 inch by 1 inch plain sliced Red oak banding on front edge. The center shelf is doweled and glued to the end panels. All other shelves (4) are adjustable on 32mm centers.
   2. Case bottoms shall be 3/4 inch plain sliced Red oak plywood with 1/8 inch x 3/4 inch plain sliced Red oak edge banding on front edge. Case bottoms shall be doweled and glued securely to end panels. Case interiors shall be flush. Totally enclosed toe space shall be 3 1/2 inches deep by 4 inches high for base units. Other sizes and materials are as follows:

a. End panel: 3/4 inch, plain sliced Red oak plywood with 1/8 inch by 3/4 inch plain sliced Red oak
b. Top face: 3/4 inch by 2 inches solid plain sliced Red oak on sliding door cases.
c. Bottom: 3/4 inch plain sliced Red oak plywood, exposed to view, 3/4 inch hardwood plywood, semi exposed or unexposed.
d. Toe space Rail: 3/4 inch by 4 inch hardwood plywood.

E. Full Height Hinged Door Cases: General construction features shall be the same as for sliding door cases except for the following: Solid or framed glass doors are to be hung on three institutional type hinges. Hinged doors shall overlap openings on four sides.

F. Counter Mount or Wall Hung Sliding Door Cases: Construction and materials shall be the same as for full height type cases with the following exceptions: Tops and bottoms shall be a minimum of 1 inch thick plain sliced Red oak hardwood plywood. Solid panel doors shall be fabricated using 3/4 inch plywood with core and grain matching adjacent furniture. Wood framed glass doors shall have 3/4 inch by 3 inch solid hardwood framing. Solid sliding glass doors shall be 1/4 inch thick float glass with polished edges and ground finger groove. Doors shall set in an aluminum bottom frame containing roller bearings and held in position with an aluminum guide at the top of the case.

G. Counter Mounted or Wall Hung Hinged Door Cases: Construction and materials shall be the same as for sliding door cases with the following exception: Solid panel or glass framed doors on cases less than 48 inches in height shall be hung on one pair of institutional type hinges. Doors on cases 48 inches high and over shall have three institutional type hinges. All doors shall overlap opening on all four sides.

H. Finishes
1. Chemical Resistant Wood Finish: The finishing process described in this section shall result in a highly chemical resistant finish that is equally suitable for an AWI premium finish application. A minimum of three pass exposed and two pass semi exposed is required along with appropriate steps for minimizing barber pole effect and glue line exposure to assure a high quality veneer appearance. Prior to application of the wood finish, case and cabinet surfaces shall be smoothly sanded to remove loose fibers, scratch marks and abrasions in the sequences described below. All dust is to be thoroughly removed from the panel prior to finish application. The finishing technology utilized shall be either 100% solids UV, water borne compression spray UV or water borne traditional compression spray.
2. Finishing Processes Allowed
a. 100 Percent Solids Ultraviolet Cured: The finish utilized shall be a 100 percent solids mixture formulated for application with automated roll coat technology cured with ultraviolet light.
b. Ultraviolet Cured Water Borne Compression Spray: The finish utilized shall be water borne mixture formulated for use in a modern sealed compression spray UV tunnel cured with ultraviolet light. The

topcoat must be increased to the quantity required to meet the chemical resistance in this specification.

c. Traditional Water Borne Compression Spray: The finish material shall be water borne compression spray. Water borne topcoats must be increased to the quantity required to meet the chemical resistance required in this specification.

3. Wood Finish Application: Finishing applications require the use of a series of steps that must be followed for compliance to this specification. This section applies to UV cured roll coat applications. Compression spray applications shall assure equivalent performance. Sanding steps must be followed to comply with the appearance standards required by this specification.

a. 400 grit cross-belt sanding (not required for plain sliced Red oak). Each exposed veneer panel shall be thoroughly sanded with modern wood processing equipment with 400 grit paper at a 30 degree angle to assure minimum barber pole and component glue line exposure.

b. 180 grit wide belt sanding. After cross belt sanding, each part that is to receive either stain or finish shall be thoroughly sanded with modern wood processing equipment with 180 grit paper in the direction of the grain. This process opens the grain for proper application and stain consistency.

c. 220 grit wide belt sanding. After 180 grit sanding, each part that is to receive either stain or finish shall be thoroughly sanded with modern wood processing equipment with 220 grit paper in the direction of the grain.

d. Staining: Staining (if required). If a stain color is selected, all exposed and semi-exposed surfaces shall be thoroughly stained in a manner which allows for a consistent application of the stain over all surfaces. The application shall ensure all areas are consistent and any visible splotchy areas are not allowed. The stain must be selected to meet the requirements of Green Seal GS-11.

e. Fill Coat: A pressed in coat of filler material must be applied to all species. Any open grain species such as Red oak, white oak, ash, beech will be filled at each pass assuring that all grain is "filled" leaving no the open pores. The fill coat will be set to approximately 0.2 millimeters in thickness or as required to fill the grain of the species selected.

f. Pre-top coat Cure: The fill coat will be gelled to a minimum of 50 percent cure prior to the application of the top coat.

g. First Top Coat: After passing the fill process, the product will enter a dual stage top coat process. A first stage roller shall apply coating material in mass proportion to assure all parts of the panel are properly coated.

h. Second Top Coat: A tandem top coat station shall then both re-apply and smooth the finish over the panel. The process shall assure a smooth and consistent application finish material evenly over the entire product.

i. Cure: The product will then be 100 percent cured with a dual ultraviolet light system or heated oven for traditional spray systems.

j. 320 Grit Scuff Sanding. Each panel will then be sanded with 320 grit paper ready for re-application of the top coat.
k. Third Pass Top Coat: Each part will again pass a single stage top coat process. The process shall assure a smooth and consistent application of finish material evenly over the entire product.
l. Cure: The product will then be 100% cured with a dual ultraviolet light system or heated oven for traditional spray systems.
m. The top coat process must be repeated as many times as are required to meet the chemical resistance requirements of this specification.

4. The final process will allow for a finish material thickness minimum of 2.0 mils for UV coatings and 3.0 mils for compression spray systems. Finishes shall be applied under atmospheric conditions that do not adversely affect both the chemical resistance and aesthetic characteristics of the finish. Once applied, all finishes shall be tested with the series of chemicals as listed in the SEFA guidelines.
5. The finish must then be tested against the SEFA guidelines. Certified 3rd party reports must be presented upon request.

I. Modified Epoxy Resin Countertops and Sinks
1. Tops, box curbs, splash rim: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Make exposed edges and corners uniformly rounded.
2. Top thickness: 1 inch thickness, unless noted otherwise with tolerance not exceeding plus or minus 1/32 inch. Provide front and end overhang of 1 inch over base cabinets, formed with continuous drip groove on under surface 1/2 inch from edge.
3. Material: Chemical and abrasion resistant, durable top of 1 inch thick cast material of epoxy resins and inert products, cast flat, with a uniform non-glare black matte finish.
4. Backsplash curb: Same material as top, 4 inches high, unless otherwise indicated on drawings, butt jointed and cemented to top. Provide where tops abut wall surfaces. Include end curb where top abuts end wall.
5. Cast modified epoxy resin: Factory molded tops of modified epoxy resin formulation, uniform thickness throughout full thickness. Provide in smooth, non-specular finish of color indicated.
a. Color: As selected by architect from manufacturer's full range.
b. Physical properties: Comply with the following minimum requirements:
1) Tensile Strength: 11,151 psi
2) Flexural Modulus: 2.13 x 10^6 psi
3) Flexural Strength: 17,171 psi
4) Compressive strength: 36,102 psi
5) Hardness (Rockwell M): 109
6) Water absorption (24 hours): +0.019
7) Heat distortion point: 342 degrees Fahrenheit
8) Thermal shock resistance: Highly resistant.
9) Chemical resistance: Spot test with the following reagents in standard laboratory concentrations, in contact with finished top for 24 hours; top shall be entirely unaffected or show only slight dulling of finish:

10) Glacial acetic acid, nitric acid, sulfuric acid, ammonium hydroxide, amyl acctate, benzene, ethyl acetate, ethyl ethyer, hydrogen peroxide, methyl ethyl ketone, phenol, trichloroethylene, zinc chloride, hydrochloric acid, phosphoric acid, chromic acid, calcium hypochlorite, acetone, aqua regia, butyl alcohol, formaldehyde, methyl alcohol, kerosene, silver nitrate, xylene.

6. Workmanship: Cast surfaces very smooth with factory cutouts for sinks and drip grooves. Fabricate plain butt-type joints assembled with epoxy adhesive.

J. Modified Epoxy Resin Sinks
1. Sink Fabrication: Molded in one piece with smooth surfaces, coved corners and bottom sloped to outlet, 1/2 inch minimum thickness as manufactured by Mott Manufacturing.
2. Provide with epoxy resin outlets.
3. Provide integral sinks in epoxy countertops, bonded to countertops with invisible joint line.

K. Service Sink
1. G2 Automated Technologies
2. Stainless Steel Scrub Sink: 60” wide x 20”sink assembly
3. 16 Gauge stainless steel
4. 2” drain

L. Pegboards
1. Provide pegboards in the size and quantity indicated on the drawings.
2. Board: Epoxy resin board finished on face and edges. Where exposed, finish back with slightly different surface texture and bevel bottom edges.
3. Pegs: polypropylene pegs in 5 inch, 6 1/2 inch and 8 inch lengths, with glassware protector base. Base of pegs shall be two-prong style for mechanical attachment. Do not bond pegs to board.
4. Drip pan: Include with pegboard, stainless steel drip pan with spout for attachment to tubing.

2.4 LABORATORY FITTINGS

A. Water Service Fittings:
1. Water service faucets and valves shall have renewable unit containing all working parts subject to wear, including replaceable stainless steel seat. Unit shall have serrations for position locking into valve body.
2. Gooseneck vacuum breakers: Brass forgings integral with gooseneck, with renewable seat and special design valve member for fine flow control.
3. Goosenecks shall have separate 3/8 inch IPS coupling securely brazed to gooseneck to provide full thread for attachment of anti-splash outlet fittings, serrated tips and filter pumps.

B. Air, Gas and Vacuum Systems Fittings:
1. Needle valves: Small pattern needle valve, straightway type with stainless steel replaceable floating cone and brass seat (non-renewable). Ten serrated end is integral with valve body.

2. Ground key cocks: Straightway ground key cocks, individually ground and lapped and tested at 100 psi. air under water. Cocks shall have single arm long easy grip handle with screw-on type index. Ten serrated end is integral with valve body.

C. Distilled Water Fittings: All brass fittings tin lined for distilled water service.
   1. Provide renewable tin lined unit containing all working parts subject to wear, including replaceable stainless steel seat. Unit shall have serrations for position locking into valve body.

D. Steam Fittings: Bonnet assembly similar to needle valve fixture. Provide valve stem with flat teflon valve disc and renewable, stainless steel valve seat.

E. Turrets for gas, air, vacuum, steam or water fixtures: "Round" type design, provided with brass shanks, locknuts and washers.

F. Handles for service cocks, faucets and remote controls: Four-arm type except ground key cocks. Provide removable screw-on type colored plastic discs with letter stamped on disc in contrasting color as scheduled below:

Service	Disc/Letter Colors	Letters
Gas	Blue/White	Gas
Vacuum	Yellow/Black	Vac.
Compressed Air	Orange/White	C-Air
Cold Water	Green/White	C.W.
Hot Water	Red/White	H.W.
Steam	Black/White	Stm.
Chilled Water	Brown/White	CH.
Distilled Water	White/Black	D.W.

[Disc color for special services as determined by Architect.

G. Fixture finish: Chrome finish developed by the following sequence of platings over properly prepared brass castings or forgings:

Plating Material	Minimum Plating Thickness
Copper (Initial)	0.000050 inch
Nickel	0.000350 inch
Chromium (Final)	0.000015 inch

H. Electrical fixtures and fittings: Flush, pedestal or line type, provided in strict accordance with the current edition of the National Electric Code of the National Fire Protection Association, and with requirements of all local regulatory authorities.
   1. Pedestal and line type housings:
      a. Pedestals: Provide with integral bases; low design for use on either single or double faces.
   2. Receptacles: Rated 120 volts A.C. at 20 amps., three wire grounding type with "Automatic Ground" feature. Provide single or duplex receptacles as required, with ivory or black colored molded thermo-set bodies.
   3. Switches: Single pole, toggle type.
   4. Flush boxes: Galvanized steel.
   5. Flush plates: Chrome plated or nylon plastic.

6. Conduit: Rigid type, of size to accommodate easy pulling of wire. Boxes, component parts and fittings shall be the screw type. Provide enamel finish on exposed conduit and ferrous fittings.

7. Pedestal and line type housings, flush boxes, receptacles and flush plates must be grounded.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Installer Qualifications: For installation and maintenance of units, an authorized representative of the furniture manufacturer required for this project.

3.2 EXAMINATION

A. Site Verification of Conditions: Do not deliver or install furniture and equipment until the following conditions have been met:
   1. Building must be enclosed (windows and doors installed and building weather-tight).
   2. An operational HVAC system that maintains temperature and humidity at 50 percent relative humidity plus or minus 15 percent and temperature 72 degrees Fahrenheit plus or minus 5 degrees in all areas of the building. Uncontrolled acclimatization will not be allowed. The use of temporary heat is not allowed under any circumstances due to imminent damage to panel products produced with environmentally friendly adhesives. The use of temporary cooling is allowed to the extent that adequate control of both temperature and humidity is in effect.
   3. Ceiling, overhead ductwork and lighting must be installed;
   4. Site must be free of any further "wet work" construction such as tiling.
   5. Floor finishes have been installed.
   6. Required backing and reinforcements must be installed accurately and the project must be read for furniture installation.

B. NOTE: In the event that any of the specified requirements for installation are not present at the time of requested delivery, the general contractor or owner must provide the furniture manufacturer with a letter of deviation that releases the manufacturer from any responsibility or liability from an damage to the products resulting from the unfavorable building conditions.

3.3 INSTALLATION

A. Furniture Installation
   1. Set furniture with components plumb, straight and square, securely anchored to building structure with no distortion. Provide concealed shims as required.
   2. Cabinets in continuous runs shall be bolted together with joints flush, uniform and tight with and alignment of adjacent units not to exceed 1/16 inch.
   3. Wall furniture shall be secured to solid material, not lath, plastic or gypsum board.
   4. Top edge surfaces shall be abutted in one true place. Joints are to be

flush and shall not exceed 1/8 inch between tops units.

5. Furniture and hardware shall be adjusted and aligned to allow for accurate connection of contact points and efficient operation of doors and drawers without any warping or binding.

3.4 CLEANING

A. Ensure all products are unsoiled and match factory finish. Remove or repair damaged or defective units.

B. Clean all finished surfaces, including drawers and cabinet shelves, and touch up as necessary.

C. Clean countertops free of grease or streaks.

3.5 PROTECTION

A. Protect counter tops and ledges with 1/4 inch ribbed cardboard for the remainder of the construction process.

END OF SECTION 12 35 53

SECTION 14 24 23 - HYDRAULIC PASSENGER ELEVATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
   1. Standard pre-engineered hydraulic passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Jack-in-Hole.
   4. Operation and control systems.
   5. Accessibility provisions for physically disabled persons.
   6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   7. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 03 Concrete: Installing inserts, sleeves and anchors in concrete.
   2. Division 04 Masonry: Installing inserts, sleeves and anchors in masonry.
   3. Division 05 Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   4. Division 09 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   5. Division 22 Plumbing:
      a. Sump pit and oil interceptor.
   6. Division 23: Heating, Ventilation and Air Conditioning
      a. Heating and ventilating hoistways and machine rooms.
   7. Division 26 Sections:
      a. Providing electrical service to elevators, including fused disconnect switches.
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in machine room, hoistway and pit.

C. Work Not Included: General contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.

1. Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.
2. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.
3. Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2 inch' at any point.
4. Elevator hoistways shall have barricades, as required.
5. Install bevel guards at 75 degrees on all recesses, projections or setbacks over 2 inches (4 inches for A17.1 2000 areas) except for loading or unloading.
6. Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports, provide divider beams between hoistway at each floor and roof.
7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.
8. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42 inches minimum, (48 inches minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.
9. Machine room to be enclosed and protected.
10. Machine Room temperature must be maintained between 55 degrees F and 90 degrees F.
11. If machine room is remote from the elevator hoistway, clear access must be available above the ceiling or metal/concrete raceways in floor for oil line and wiring duct from machine room.
12. Access to the machinery space and machine room must be in accordance with the governing authority or code.
13. Provide an 8 x 16 inch cutout through machine room wall, for oil line and wiring duct, coordinated with elevator contractor at the building site.
14. All wire and conduit should run remote from either the hoistways or the machine room.
15. When heat, smoke or combustion sensing devices are required, connect to elevator machine room terminals. Contacts on the sensors should be sided for 120 volt D.C.
16. Install and furnish finished flooring in elevator cab.
17. Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. The general contractor shall supply the wall framing so that the wall fire resistance rating is maintained, when gypsum board wall construction is used.
18. Where gypsum board construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Contractor to coordinate with elevator contractor.
19. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
20. To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.

21. The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.
22. General Contractor shall fill and grout around entrances, as required.
23. Elevator sill supports shall be provided at each opening.
24. All walls and sill supports must be plumb where openings occur.
25. Locate a light fixture and convenience outlet in pit with switch located adjacent to the access door.
26. A light switch and fused disconnect switch for each elevator should be located inside the machine room adjacent to the door, where practical, per the National Electrical Code (NFPA No. 70).
27. As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway (or in the machine room).
28. For signal systems and power operated door: provide ground and branch wiring circuits, including main line switch. For car light and fan: provide a feeder and branch wiring circuits, including main line switch.
29. Wall thickness may increase when fixtures are mounted in drywall. These requirements must be coordinated between the general contractor and the elevator contractor.
30. Provide supports, patching and recesses to accommodate hall button boxes, signal fixtures, etc..
31. Locate telephone and convenience outlet on control panel.

1.3 SUBMITTALS

A. Product data: When requested, the elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.

B. Shop drawings:
1. Show equipment arrangement in the machine room/control space, pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Shop drawings shall include the following note completed and signed by the Contractor:
1. THE DATA SUBMITTED DOES NOT CONTAIN MATERIAL DEVIATION FROM REQUIREMENTS OF CONTRACT DOCUMENTS EXCEPT AS FOLLOWS

D. Plastic laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.

E. Metal Finishes: Upon request, standard metal samples provided.

F. Operation and maintenance data. Include the following:

1. Owners Manual and Wiring Diagrams.
2. Parts list, with recommended parts inventory.

1.4 QUALITY ASSURANCE

D. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in manufacturing, installing, and servicing elevators of the type required for the project.
   1. Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
      a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
   2. The manufacturer shall have a documented, on-going quality assurance program.

E. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than fifteen years of satisfactory experience installing elevators equal in character and performance to the project elevators.

F. Regulatory Requirements:
   1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   2. Building Code: National.
   3. NFPA 70 National Electrical Code.
   4. NFPA 80 Fire Doors and Windows.
   5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

G. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, UL10(B), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory.

H. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
   1. Arrange for inspections and make required tests.
   2. Deliver to the Owner upon completion and acceptance of elevator work.

1.5 DELIVERY, STORAGE AND HANDLING

D. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.6 PROJECT CONDITIONS

D. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

E. Provide the hole for the jack unit (if required by the type of jack provided). Provide a casing if required to retain the walls of the hole. General contractor shall remove excavation spoils deposited in the elevator pit.

1.7 WARRANTY

D. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months from date of Substantial Completion.

1.8 MAINTENANCE

D. Furnish maintenance and call back service for a period of 12 months for each elevator from date of Substantial Completion during normal working hours, excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.
   1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers listed are intended to indicate standard of quality required. Catalog numbers and names are products of first named manufacturer unless otherwise indicated. Subject to compliance with requirements, manufacturers offering products complying with specifications include, but are not limited to the following:
   1. ThyssenKrupp Elevator.
   2. Kone.
   3. Otis.

2.2 MATERIALS, GENERAL

A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.

B. Steel:
   1. Shapes and bars: Carbon.
   2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
   3. Finish: Factory-applied baked enamel.

C. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050 inch thickness.

D. Carpet: By others.

2.3 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed.

B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.

D. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.

E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor or continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.

F. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction.
   1. Provide the following jack type: Single post conventional (in ground). Single polished steel hydraulic plunger housed in a steel sealed casing with sufficient clearance space to allow for alignment during installation.
   2. The casing shall have a dished endcap and safety bulkhead as required by A17.1 code.
   3. The plunger shall have a high-pressure sealing system which will not allow for seal movement or displacement during the course of operation.
   4. The jack system will be supplied with Schedule 40 PVC or an HDPE protection system complying with A17.1 code requirements to prevent in ground corrosion of the casing.
   5. The jack casing shall have a bleeder valve to discharge any air trapped in the jack.

G. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

H. Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade oil as specified by the manufacturer of the power unit.

2.4 POWER UNIT

A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit consisting of the following items:
   1. Oil reservoir with tank cover.

2. An oil hydraulic pump.
3. An electric motor.
4. Oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.

B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.

C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating shall be selected for specified speed and load.

D. Control System: Shall be microprocessor based and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure.

E. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
1. Relief valve shall be externally adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.

F. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.

2.5 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
2. Main landing door and frame finish: Stainless steel panels, No. 4 brushed finish.
3. Typical door and frame finish: Stainless steel panels, no. 4 brushed finish.

B. Interlocks: Equip each hoistway entrance with an approved type interlock tested

as required by code. Provide door restriction devices as required by code.

C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.6 CAR ENCLOSURE

A. Car Enclosure:
   1. Walls: Cab type TKAP, reinforced cold-rolled steel with two coats factory applied baked enamel finish, with applied vertical wood core panels covered on both sides with high pressure plastic laminate; color to be selected from manufacturer’s full range of options.
      a. Reveals and frieze: Stainless steel, No. 4 brushed finish.
      b. Protection Buttons and Pads - Not Required.
   2. Canopy: Cold-rolled steel with hinged exit.
   3. Ceiling: Suspended type, fluorescent lighting with translucent diffuser mounted in a metal frame.
   4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
   5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
      a. Door Finish: Stainless steel panels: No. 4 brushed finish.
      b. Cab Sills: Extruded aluminum, mill finish.
   6. Handrail: Provide 2 inch flat metal bar on side and rear walls. Handrails shall have a stainless steel, No. 4 brushed finish.
   7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.

B. Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.7 DOOR OPERATION

A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after

an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.

1. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

B. Door Protection Devices: Provide a door protection system using microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.8 CAR OPERATING STATION

A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.

B. Emergency Communications System: Phone box provided. Instrument by others.

C. Auxiliary Operating Panel: Not Required

D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

2.9 CONTROL SYSTEMS

A. Controller: The elevator control system shall be microprocessor based and software oriented. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.

2.10 HALL STATIONS

A. Hall Stations, General: Provide one pushbutton riser with faceplates having a brushed stainless steel finish.

1. Provide keyed Hall Call stations.
2. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall

comply with Americans with Disabilities Act (ADA) requirements.

C. Hall Position Indicator: Not Applicable

D. Hall lanterns: Not required for this application.

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

A. Oil Hydraulic Silencer: Install an oil hydraulic silencer (muffler device) at the power unit location. The silencer shall contain pulsation absorbing material inserted in a blowout proof housing arranged for inspecting interior parts without removing unit from oil line.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and machine rooms/control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
   1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
   2. Comply with the National Electrical Code for electrical work required during installation.

B. Jack unit excavation: Drill or otherwise excavate below elevator pit construction as required to install the jack unit.
   1. Install casing for jack unit.
   2. Provide HDPE jack protection system for all in ground jacks.
   3. Set casing for jack unit assembly plumb, and partially fill with water- settled sand, eliminating voids. Back fill depth shall be sufficient to hold the bottom of the jack in place over time.

C. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

D. Alignment: Coordinate installation of hoistway entrances with installation of

elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

E. Lubricate operating parts of system where recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.4 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.5 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.6 PROTECTION

A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.7 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.8 ELEVATOR SCHEDULE

A. Elevator Qty. 1
   1. Elevator Model: Endura MRL 2500 Twin Post 2 Stage
   2. Rated Capacity: 2500 lbs.
   3. Rated Speed: 150 ft./min.
   4. Operation System: TAC20
   5. Travel: 15'-4"
   6. Landings: 2 total
   7. Openings: Front: 2 / Rear: N/A
   8. Clear Car Inside: 5' - 8" wide x 4' - 3" deep
   9. Cab Height: 8' nominal
   10. Hoistway Entrance Size: 3' - 0" wide x 7'-0 high
   11. Door Type: Single Speed
   12. Power Characteristics: 480 volts, 3 Phase, 60 Hz.
   13. Provide battery powered lowering.
   14. Fixture and Button Style: Signa4.
   15. Seismic Data:
      a. Occupancy Category: III
      b. Importance Factor: 1.25
      c. Site Class: C
      d. Seismic Design Category: C

END OF SECTION 14 24 23