STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

Request For Bids For Construction Services

Two-Stage Bidding Process

Stage II
Single Project

September 22, 2005

BOARD OF REGENTS CONFERENCE CENTER

UTAH HIGHER EDUCATION ASSISTANCE AUTHORITY

SALT LAKE CITY, UTAH

DFCM Project No. 04254300

MHTN Architects, Inc.

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Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM:

DFCM General Conditions dated May 25, 2005
DFCM Application and Certificate for Payment dated May 25, 2005

Technical Specifications: as prepared by MHTN Architects, Inc.
Drawings: as prepared by MHTN Architects, Inc.

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

NOTICE TO CONTRACTORS

ONLY CONTRACTORS PREVIOUSLY SHORT-LISTED DURING STAGE I AND THE CURRENT FY2006 SHORT-LISTED GENERAL CONTRACTORS ARE ALLOWED TO BID ON THIS PROJECT

The State of Utah - Division of Facilities Construction and Management (DFCM) is requesting bids for the construction of the following project:

BOARD OF REGENTS CONFERENCE CENTER
UTAH HIGHER EDUCATION ASSISTANCE AUTHORITY, SALT LAKE CITY, UTAH
DFCM PROJECT NO: 04254300

This project includes the remodel of approximately 5,600 SF of the first floor lobby area at the Board of Regents Building located at The Gateway including; new reception area, interview rooms and office area, reconfigured vestibules, men and women's toilets, kitchen area, storage area, assembly room and conference room. Additionally, the following are Owner Furnished/Owner Installed items: (1) Furniture; (2) Audio/Visual equipment and wiring, and; (3) Phone/Data equipment and wiring. Construction cost estimate: $455,000

The bid documents will be available at noon on Thursday, September 22, 2005 in electronic format from DFCM at 4110 State Office Building, Salt Lake City, Utah 84114, telephone (801)538-3018 and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Bill Bowen, Project Manager, DFCM, at (801) 538-3271. No others are to be contacted regarding this project.

A **MANDATORY** pre-bid meeting and site visit will be held at 9:00 AM on Tuesday, September 27, 2005 at the Board of Regents Building, The Gateway, 60 South 400 West, Salt Lake City, Utah. All short listed prime contractors wishing to bid on this project must attend this meeting.

Bids must be submitted by 3:00 PM on Wednesday, October 5, 2005 to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. Note: Bids must be received at 4110 State Office Building by the specified time. The contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction & Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of the State.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
MARLA WORKMAN, CONTRACT COORDINATOR
4110 State Office Bldg., Salt Lake City, Utah 84114

STAGE II BIDDING PROCESS

ONLY CONTRACTORS PREVIOUSLY SHORT-LISTED DURING STAGE I AND THE CURRENT FY2006 SHORT-LISTED GENERAL CONTRACTORS ARE ALLOWED TO BID ON THIS PROJECT

1. Bid Procedures

Bid Documents: Bidding documents including plans and specifications (if applicable) may be obtained by accessing DFCM's web page at http://dfcm.utah.gov or at DFCM's office 4110 State Office Building, Salt Lake City, Utah 84114.

Mandatory Pre-Bid Site Meeting: If required, the schedule contained in this document will indicate the date, time, and place of the mandatory pre-bid site meeting. At this meeting, contractors will receive additional instructions about the project and have an opportunity to ask questions about project details. If a firm fails to attend a pre-bid site meeting labeled "Mandatory" they will not be allowed to bid on the project.

Written Questions: The schedule contained in this document will indicate the deadline for submitting questions in writing to the DFCM Representative pertaining to this project.

Final Addendum: The schedule contained in this document will indicate the deadline for DFCM issuing the final addendum clarifying questions and changes to the scope of work. Contractors are responsible for obtaining and responding to information contained in the addenda.

Submitting Bids: Bids must be submitted to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114 by the deadline indicated on the schedule contained in this document. Bids submitted after the deadline will not be accepted. Bids will be opened at DFCM on the date, time, and place indicated on the schedule. (Additional information pertaining to bidding is contained later in this document). It is your responsibility to allow for the time needed to park on Capitol Hill as recent construction activity has made the parking more difficult. Identification is required to enter the building.

Subcontractors List: The firm selected for the project must submit a list of all subcontractors by the deadline indicated on the schedule contained in this document. (Additional information pertaining to subcontractor lists is contained later in this document)

2. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Notice to Contractors.

3. **Bids**

Before submitting a bid, each bidder shall carefully examine the Contract Documents; shall visit the site of the Work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the Contract Documents. If the bidder observes that portions of the Contract Documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Representative and the necessary changes shall be accomplished by Addendum.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Notice to Contractor's prior to the published deadline for the submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a bid bond form other than the DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **Note: A cashier's check cannot be used as a substitute for a bid bond.**

4. **Contract and Bond**

The Contractor's Agreement will be in the form bound in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the Contract Sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for Subcontractors will be specified in the Supplementary General Conditions.

5. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", which are included as part of these Contract Documents. The subcontractors list shall be delivered to DFCM or faxed to DFCM at (801)538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the Contract Documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements is subject to a debarment hearing and may be debarred from consideration for award of contract for a period of up to three years.

6. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Representative a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by Addenda duly issued and a copy of such Addenda will be mailed or delivered to each person or entity receiving a set of documents. Neither DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

7. Addenda

Any Addenda issued during the time of bidding shall become part of the Contract Documents made available to the bidders for the preparation of the bid, shall be covered in the bid, and shall be made a part of the Contract.

8. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of the State of Utah to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. The DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc.

9. **DFCM Contractor Performance Rating**

DFCM will evaluate the performance of the Contractor. This evaluation may include comments from the User. The Contractor will have an opportunity to review and comment on the evaluation. Evaluations, including the Contractor's comments, may be considered in future selection in the evaluation of the Contractor's past performance.

10. **Licensure**

The Contractor shall comply with and require all of its Subcontractors to comply with the license laws as required by the State of Utah.

11. **Right to Reject Bids**

DFCM reserves the right to reject any or all Bids.

12. **Time is of the Essence**

The completion deadline for this project is: **Substantial Completion must be achieved by February 11, 2006. Certificate of Occupancy must be achieved by February 18, 2006**. Failure to meet the completion deadline may result in a poor performance rating from DFCM which may have a negative impact on your firm's ability to obtain future work with the state of Utah and may also result in liquidated damages being assessed. Time is of the essence in regard to all the requirements of the Contract Documents.

13. **Withdrawal of Bids**

Bids may be withdrawn on written request received from bidders within 24 hours after the bid opening if the contractor has made an error in preparing the bid.

14. **Product Approvals**

Where reference is made to one or more proprietary products in the Contract Documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the Contract Documents, the products of other manufacturers will be accepted, provided they equal or exceed

the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued Addendum. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the A/E.

15. **Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors**

Contractors shall respond promptly to any inquiry in writing by the DFCM to any concern of financial responsibility of the Contractor, Subcontractor or Sub-subcontractor.

16. **Debarment**.

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by the DFCM as part of the requirements for award of the Project.

PROJECT SCHEDULE
Stage II = Two-Stage Bidding Process

PROJECT NAME:	**BOARD OF REGENTS CONFERENCE CENTER UTAH HIGHER EDUCATION ASSISTANCE AUTHORITY SALT LAKE CITY, UTAH**			
DFCM PROJECT NO.	**04254300**			
Event	**Day**	**Date**	**Time**	**Place**
Stage II Bidding Documents Available	Thursday	September 22, 2005	12 NOON	DFCM, 4110 State Office Bldg, SLC, UT and DFCM web site*
Mandatory Pre-Bid Site Meeting	Tuesday	September 27, 2005	9:00 AM	Board of Regents Bldg at The Gateway 60 South 400 West SLC, UT
Last Day To Submit Questions	Thursday	September 29, 2005	4:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Final Addendum Issued	Monday	October 3, 2005	4:00 PM	DFCM, 4110 State Office Bldg, SLC, UT or DFCM web site*
Bids Due	Wednesday	October 5, 2005	3:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Subcontractors List Due	Thursday	October 6, 2005	3:00 PM	DFCM, 4110 State Office Bldg, SLC, UT
Project Completion Dates	Substantial Completion: Certificate of Occupancy:	February 11, 2006 February 18, 2006		

*** DFCM's web site address is http://dfcm.utah.gov**

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the Request for Bids for the **BOARD OF REGENTS CONFERENCE CENTER - DFCM PROJECT NO. 04254300** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

BASE BID:
_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

ADD ALTERNATE #1: Reconfigure ceiling in Elevator Lobby area.
_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be **Substantially Complete by February 11, 2006 and Certificate of Occupancy by February 18, 2006** after receipt of the Notice to Proceed, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$250.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract. The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within time set forth.

Type of Organization:

_____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and_____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the_____ _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By:_____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By:_____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

By: _____

Attorney-in-Fact (Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this ____ day of _____, 20_____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone:

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTION AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, on the following basis:

PROJECTS UNDER $500,000 - ALL SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE - ALL SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- Bidder must list "Self" if performing work itself.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

BIDDER LISTING 'SELF' AS PERFORMING THE WORK:

Any bidder that is properly licensed for the particular work and intends to perform that work itself in lieu of a subcontractor that would otherwise be required to be on the subcontractor list, must insert the term 'Self' for that category on the subcontractor list form. Any listing of 'Self' on the sublist form shall also include the amount allocated for that work.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self"	300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: 350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCNTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

SUBCONTRACTORS LIST

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR DFCMS REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY DFCM. ATTACH A SECOND PAGE IF NECESSARY.

FUGITIVE DUST PLAN

The Contractor will fill out the form and file the original with the Division of Air Quality and a copy of the form with the Division of Facilities Construction & Management, prior to the issuance of any notice to proceed.

The Contractor will be fully responsible for compliance with the Fugitive Dust Control Plan, including the adequacy of the plan, any damages, fines, liability, and penalty or other action that results from noncompliance.

Utah Division of Air Quality
April 20, 1999

GUIDANCE THAT MUST BE CONSIDERED IN DEVELOPING AND SUBMITTING A DUST CONTROL PLAN FOR COMPLIANCE WITH R307-309-3, 4, 5, 6, 7

Source Information:

1. Name of your operation (source): provide a name if the source is a construction site.

2. Address or location of your operation or construction site.

3. UTM coordinates or Longitude/Latitude of stationary emission points at your operation.

4. Lengths of the project, if temporary (time period).

5. Description of process (include all sources of dust and fugitive dust). Please, if necessary, use additional sheets of paper for this description. Be sure to mark it as an attachment.

6. Type of material processed or disturbed.

7. Amount of material processed (tons per year, tons per month, lbs./hr., and applicable units).

8. Destination of product (where will the material produced be used or transported, be specific, provide address or specific location), information needed for temporary relocation applicants.

9. Identify the individual who is responsible for the implementation and maintenance of fugitive dust control measures. List name(s), position(s) and telephone number(s).

10. List, and attach copies of any contract lease, liability agreement with other companies that may, or will, be responsible for dust control on site or on the project.

Description of Fugitive Dust Emission Activities
(Things to consider in addressing fugitive dust control strategies.)

1. Type of activities (drilling and blasting, road construction, development construction, earth moving and excavation, handling and hauling materials, cleaning and leveling, etc).

2. List type of equipment generating the fugitive dust.

3. Diagram the location of each activity or piece of equipment on site. Please attach the diagram.

4. Provide pictures or drawings of each activity. Include a drawing of the unpaved/paved road network used to move loads "on" and "off" property.

5. Vehicle miles travels on unpaved roads associated with the activity (average speed).

6. Type of dust emitted at each source (coal, cement, sand, soil, clay, dust, etc.)

7. Estimate the size of the release area at which the activity occurs (square miles). For haul or dirt roads include total miles of road in use during the activity.

Description of Fugitive Dust Emission Controls on Site

Control strategies must be designed to meet 20% opacity or less on site (a lesser opacity may be defined by Approval Order conditions or federal requirements such as NSPS), and control strategies must prevent exceeding 10% opacity from fugitive dust at the property boundary (site boundary) for compliance with R307-309-3.

1. Types of ongoing emission controls proposed for each activity, each piece of equipment, and haul roads.

2. Types of additional dust controls proposed for bare, exposed surfaces (chemical stabilization, synthetic cover, wind breaks, vegetative cover, etc).

3. Method of application of dust suppressant.

4. Frequency of application of dust suppressant.

5. Explain what triggers the use of a special control measure other than routine measures already in place, such as covered loads or measures covered by a permit condition (increase in opacity, high winds, citizen complaints, dry conditions, etc).

6. Explain in detail what control strategies/measures will be implemented off-hours, i.e., Saturdays/Sundays/Holidays, as well as 6 PM to 6 AM each day.

Description of Fugitive Dust Control Off-site

Prevent, to the maximum extent possible, deposition of materials, which may create fugitive dust on public and private paved roads in compliance with R307-309-5, 6, 7.

1. Types of emission controls initiated by your operation that are in place "off" property (application of water, covered loads, sweeping roads, vehicle cleaning, etc.).

2. Proposed remedial controls that will be initiated promptly if materials, which may create fugitive dust, are deposited on public and private paved roads.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Fugitive Dust Control Plan Violation Report

When a source is found in violation of R307-309-3 or in violation of the Fugitive Dust Control Plan, the course must submit a report to the Executive Secretary within 15 days after receiving a Notice of Violation. The report must include the following information:

1. Name and address of dust source.

2. Time and duration of dust episode.

3. Meteorological conditions during the dust episode.

4. Total number and type of fugitive dust activities and dust producing equipment within each operation boundary. If no change has occurred from the existing dust control plan, the source should state that the activity/equipment is the same.

5. Fugitive dust activities or dust producing equipment that caused a violation of R-307-309-3 or the sources dust control plan.

6. Reasons for failing to control dust from the dust generating activity or equipment.

7. New and/or additional fugitive dust control strategies necessary to achieve compliance with R307-309-3, 4, 5, 6, or 7.

8. If it can not be demonstrated that the current approved Dust Control Plan can result in compliance with R307-309-3 through 7, the Dust Control Plan must be revised so as to demonstrate compliance with 307-309-3 through 7. Within 30 days of receiving a fugitive dust Notice of Violation, the source must submit the revised Plan to the Executive Secretary for review and approval.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Attachments: DFCM Form FDR R-307-309, Rule 307-309

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100%

Performance Bond and a 100% Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete within _____ (___) calendar days after the date of the Notice to Proceed. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the

Contractor requests payment and agrees to safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

_____
Please type/print name clearly

State of _____)
)
County of _____)

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
Financial Manager, Date
Division of Facilities Construction and Management

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
_____ Date
Manager -
Capital _____

APPROVED AS TO FORM:
ATTORNEY GENERAL
May 25, 2005
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____ (Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20___, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____

Agent: _____

Address: _____

Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____
(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____
Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20_____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

DFCM FORM 7b-2 012405

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

CHANGE ORDER #_____

CONTRACTOR:

ARCHITECT:

AGENCY OR INSTITUTION:
PROJECT NAME:
PROJECT NUMBER:
CONTRACT NUMBER:
DATE:

CONSTRUCTION CHANGE DIRECTIVE NO.	PROPOSAL REQUEST NO.	AMOUNT		DAYS	
		INCREASE	DECREASE	INCREASE	DECREASE

	Amount	Days	Date
ORIGINAL CONTRACT			
TOTAL PREVIOUS CHANGE ORDERS			
TOTAL THIS CHANGE ORDER			
ADJUSTED CONTRACT			

DFCM and Contractor agree that the terms, contract sum, scope of the Work and time specified in this Change Order shall constitute the full accord and satisfaction, and complete adjustment to the Contract and includes all direct and indirect costs and effects related to, incidental to, and/or reasonably implied from such change in the contract terms, sum, scope of the Work and time.

Contractor:_____
Date

Architect/Engineer:_____
Date

Agency or Institution:_____
Date

DFCM: _____
Date

Funding Verification:_____
Date

Page _____ of _____page(s)

DFCM FORM 7b-2 012405

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

_____

A list of items to be completed or corrected is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof.

The Contractor shall complete or correct the Work on the list of items appended hereto within _____ calendar days from the above date of issuance of this Certificate. The amount withheld pending completion of the list of items noted and agreed to shall be: $_____.

_____ by: _____
CONTRACTOR (include name of firm) DATE

_____ by: _____
A/E DATE

_____ by: _____
USING INSTITUTION OR AGENCY DATE

_____ by: _____
DFCM DATE

cc: Parties Noted
DFCM, Director

BOARD OF REGENTS CONFERENCE CENTER
60 SOUTH 400 WEST
SALT LAKE CITY, UTAH

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

CONSTRUCTION SPECIFICATION
15 SEPTEMBER 2005

DFCM PROJECT NO 04254300

MHTN ARCHITECTS

420 East South Temple, Suite 100 . Salt Lake City . Utah . 84111 . 801.595.6700 . Fax 801.595.6717 . www.mhtn.com

BOARD OF REGENTS CONFERENCE CENTER

DFCM Project No. 04254300
MHTN Project No. 2005539.00

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15 SEPTEMBER 2005

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SECTION 01100 - SUMMARY

1.1 GENERAL

1. Project Identification: Project is identified as Conference Center for the Board of Regents, The Gateway Salt Lake City, Utah.

2. Architect Identification: The Contract Documents were prepared for Project by MHTN Architects, 420 East South Temple, Salt Lake City, UT 84111..

B. The Contractor will be responsible for protection and repair of existing finishes and dust control measures

No on-site storage of materials and equipment outside the work area is permitted.

C. Project will be constructed under a general construction contract.

D. Use of Premises: Contractor shall limit impact on the premises to allow Owner's continuing operations and public use, working within temporary dustproof partitions required to be in place prior to any construction operations where dust is produced that will transmit into other building areas.. Contractor's use of premises is limited to the immediate work areas..

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

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

END OF SECTION 01100

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

1.1 GENERAL

A. Coordination: Related Sections include the following:

1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

B. Minor Changes in the Work: Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

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

1. Proposal Requests are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

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

D. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

E. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

F. Change Order Procedures: On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

G. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. This will only be used if allowed by Article 13 of the Owner's General Conditions and the Owner's Project Engineer.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

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

1.2 PRODUCTS (Not Used)

1.3 EXECUTION (Not Used)

END OF SECTION 01250

SECTION 01290 - PAYMENT PROCEDURES

1.1 GENERAL

A. Coordination: Related Sections include the following:
   1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   2. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

B. Schedule of Values: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule if requested by Owner. Correlate line items with other required administrative forms and schedules, including Submittals Schedule and Application for Payment forms with Continuation Sheets.

   1. Submit the Schedule of Values to Architect at earliest possible date but no later than **seven** days before the date scheduled for submittal of initial Applications for Payment unless the Owner requires additional time for review.
   2. Format and Content: Use the Project Manual table of contents as a guide to establish line items for Schedule of Values. Provide at least one line item for each Specification Section.
   3. Identification: Include the following Project identification on the Schedule of Values:

      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.

   4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment. Provide several line items for principal subcontract amounts. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

   5. Provide a separate line item for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   6. Provide separate line items for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

   7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

      a. Temporary facilities and other items that are not direct cost of work-in-place may be shown either as separate line items or distributed as general overhead expense.

   8. Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

C. Applications for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and Final Application for Payment involve additional requirements.

2. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

3. Payment Application Forms: Use **AIA Document G702 and AIA Document G703 Continuation Sheets** as form for Applications for Payment.

4. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. **Architect** will return incomplete applications without action.

   a. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
   b. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

5. Transmittal: Submit **3** signed and notarized original copies of each Application for Payment to **Architect** by a method ensuring receipt **within 24 hours**. One copy shall include waivers of lien and similar attachments if required. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
6. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

   a. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
   b. When an application shows completion of an item, submit final or full waivers.
   c. Owner reserves the right to designate which entities involved in the Work must submit waivers.
   d. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.

      1) Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

   e. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

7. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

   a. List of subcontractors.
   b. Schedule of Values.
   c. Contractor's Construction Schedule (preliminary if not final).
   d. Submittals Schedule (preliminary if not final).
   e. List of Contractor's staff assignments.
   f. Copies of building permits.

g. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
h. Certificates of insurance and insurance policies.
i. Performance and payment bonds.

8. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

   a. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   b. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

9. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

   a. Evidence of completion of Project closeout requirements.
   b. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   c. Updated final statement, accounting for final changes to the Contract Sum.
   d. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
   e. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
   f. AIA Document G707, "Consent of Surety to Final Payment."
   g. Evidence that claims have been settled.
   h. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

1.1 GENERAL

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

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

    a. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

D. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Indicate relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Refer to Division 16 Sections for specific Coordination Drawing requirements for electrical installations.

E. Project Meetings, General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within **3** days of the meeting.

F. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect. Hold the conference at Project site. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

   a. Tentative construction schedule.
   b. Phasing.
   c. Critical work sequencing.
   d. Designation of responsible personnel.
   e. Procedures for processing field decisions and Change Orders.
   f. Procedures for processing Applications for Payment.
   g. Distribution of the Contract Documents.
   h. Submittal procedures.
   i. Preparation of Record Documents.
   j. Use of the premises.
   k. Responsibility for temporary facilities and controls.
   l. Parking availability.
   m. Office, work, and storage areas.
   n. Equipment deliveries and priorities.
   o. First aid.
   p. Security.
   q. Progress cleaning.
   r. Working hours.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.2 PRODUCTS (Not Used)

1.3 EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01330 - SUBMITTAL PROCEDURES

1.1 GENERAL

A. Definitions: As follows:

1. Action Submittals: Written and graphic information that requires Architect's responsive action.
2. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

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 parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.

1. Initial Review: Allow **10** days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Allow **10** days for processing each resubmittal.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately **4 by 5 inches (100 by 125 mm)** on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on 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. Unique identifier, including revision number.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.

k. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Additional copies submitted for maintenance manuals will **not** be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will **discard submittals** received from sources other than Contractor unless previously approved prior to submittal.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

1.2 PRODUCTS

A. Action Submittals: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit five copies of each submittal, unless otherwise indicated. Architect will return three copies. Mark up and retain one returned copy as a Project Record Document.
2. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

a. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
b. Mark each copy of each submittal to show which products and options are applicable.
c. Include the following information, as applicable:

1) Manufacturer's written recommendations.
2) Manufacturer's product specifications.
3) Manufacturer's installation instructions.
4) Manufacturer's catalog cuts.
5) Wiring diagrams showing factory-installed wiring.
6) Printed performance curves.
7) Operational range diagrams.
8) Compliance with recognized trade association standards.
9) Compliance with recognized testing agency standards.

3. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Shopwork manufacturing instructions.
f. Templates and patterns.
g. Schedules.
h. Notation of coordination requirements.
i. Notation of dimensions established by field measurement.
j. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
k. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).

4. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."
5. Samples: Prepare physical units of materials or products, including the following:

a. Comply with requirements in Division 1 Section "Quality Requirements" for mock-ups.
b. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
c. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected.
d. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.
e. 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 final submittal and actual component as delivered and installed.
f. Number of Samples for Initial Selection: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
g. Number of Samples for Verification: Submit **three** sets of Samples. Architect will retain **two** Sample sets; remainder will be returned.
h. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

6. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.
7. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."
8. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
9. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."
10. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."

11. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.
12. Informational Submittals: Prepare and submit Informational Submittals required by other Specification Sections.

13. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will not return copies.
14. Certificates and Certifications: Provide a notarized statement that includes signature of Contractor, testing agency, or design professional responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of the company.
15. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
16. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
17. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
18. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
19. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
20. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
21. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
22. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
23. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
24. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
25. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
26. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."
27. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
28. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

29. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.
30. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
31. Construction Photographs: Comply with requirements in Division 1 Section "Construction Progress Documentation."

1.3 EXECUTION

A. Contractor's Review: Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Architect's Action: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

1. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken
2. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
3. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01420 - REFERENCES

1.1 GENERAL

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.

D. "Indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.

E. "Regulations" include laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide" means to furnish and install, complete and ready for the intended use.

I. "Installer" is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

   1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

J. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.

K. Industry Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

L. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.

M. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.

N. Copies of Standards: Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

O. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.2 PRODUCTS (Not Used)

1.3 EXECUTION (Not Used)

END OF SECTION 01420

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

1.1 GENERAL

A. Use Charges: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost

Where Owner provides temporary utilities, conduct work to conserve energy usage.

B. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

C. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

1.2 PRODUCTS

A. Materials: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended
1. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
2. Water: Potable.

B. Temporary Partitions: Erect and maintain dustproof partition to limit dust and dirt migration and to separate areas from sawdust fumes and noise where modifications are required

1. Construct dustproof partitions with flame retardant polyethylene sheet material, sealed at floor and ceiling and tape all joints in sheet goods.
2. Protect air-handling equipment. If return air exists inside partitioned work area, add additional filter material to block particulate contamination or disable airflow if other sources for return air exist,

C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

D. Toilets; contractor shall provide janitorial services to clean existing facilities on a daily basis and to tenant finish levels upon completion of the work.

E. Electrical Outlets: Extension cords with NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

1.3 EXECUTION

A. Installation, General: Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work and Owner's continued use. Relocate and modify facilities as required.

1. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

B. Support Facilities Installation: Comply with the following:

1. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Remove debris on a daily basis. Do not encumber Owner's waste collection system with construction debris.

2. Dumpster location, if required will be directed by Owner for placement.

C. Security and Protection Facilities Installation: Comply with the following:

1. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

2. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

a. Provide portable fire extinguishers, in area of work.

D. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

E. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage

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

1. Materials and facilities that constitute temporary facilities are the property of Contractor.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 01500

SECTION 01600 - PRODUCT REQUIREMENTS

1.1 GENERAL

A. Definitions: As follows:

1. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

   a. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   b. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   c. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

2. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
3. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design", "Design Standard" or similar wording including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
4. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
5. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use **CSI Form 13.1A**.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

   a. Statement indicating why specified material or product cannot be provided.
   b. Coordination information, including a list of changes or modifications needed to accommodate proposed substitution.
   c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified.
   d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   e. Samples, where applicable or requested.

f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or **7** days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.
b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

D. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

E. Product Delivery, Storage, and Handling: Use means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Schedule delivery to eliminate storage at Project site and to prevent overcrowding of construction spaces. Deliveries must not be prior to 8:00a.m.
2. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

1.2 PRODUCTS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Where products are accompanied by the term "as selected," Architect will make selection.
4. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
5. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.

   a. Substitutions may be considered, unless otherwise indicated.

2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.

   a. Substitutions may be considered, unless otherwise indicated.

3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

   a. Substitutions may be considered, unless otherwise indicated.

4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

   a. Substitutions may be considered, unless otherwise indicated.

5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Paragraph to obtain approval for use of an unnamed product.
6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Paragraph to obtain approval for use of an unnamed product.
7. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Paragraph.
8. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product" "Design Standard" or similar language are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on

the product named. Comply with provisions in "Comparable Products" Paragraph to obtain approval for use of an unnamed product.

9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.

   a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.

10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.

   a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.

   b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

C. Product Substitutions: Architect will consider requests for substitution if received within 10 days after **commencement of the Work**. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

   a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services.

   b. Requested substitution does not require extensive revisions to the Contract Documents.

   c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

   d. Substitution request is fully documented and properly submitted.

   e. Requested substitution will not adversely affect Contractor's Construction Schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.

g. Requested substitution is compatible with other portions of the Work.

h. Requested substitution has been coordinated with other portions of the Work.

i. Requested substitution provides specified warranty.

D. Comparable Products: Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

1.3 EXECUTION (Not Used)

END OF SECTION 01600

Advancement of Construction Technology

SUBSTITUTION REQUEST
(After the Bidding Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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SUBSTITUTION REQUEST
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

_____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

_____

_____

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SECTION 01700 - EXECUTION REQUIREMENTS

1.1 GENERAL (Not used)

1.2 PRODUCTS (Not Used)

1.3 EXECUTION

A. Existing Conditions: The existence and location of construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents

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

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal wiring in finished areas, unless otherwise indicated.
4. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
5. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

    a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
    b. Allow for building movement, including thermal expansion and contraction.

6. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
7. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

F. Progress Cleaning: Clean Project site and work areas daily, including common areas.. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 1 day.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
4. Where dust would impair proper execution of the Work, vacuum the entire work area, as appropriate.
5. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended.
6. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
7. Waste Disposal: Burying or burning waste materials on-site is not possible or permitted. Washing waste materials down sewers or into waterways will not be permitted.

G. Protection of Installed Construction: Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

H. Correction of the Work: Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
2. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION 01700

Advancement of Construction Technology

REQUEST FOR INTERPRETATION

Project: _____

_____

To: _____

_____

Re: _____

R.F.I. Number: _____

From: _____

Date: _____

A/E Project Number: _____

Contract For: _____

Specification Section: Paragraph: Drawing Reference: Detail:

Request:

Signed by: Date:

Response:

☐ Attachments

Response From: To: Date Rec'd: Date Ret'd:

Signed by: Date:

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ File

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SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of designated areas
2. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 1 Section "Summary" for use of the premises and phasing requirements.

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.

B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Proposed **Dust-Control and Noise-Control** Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Tenant's on-site operations are uninterrupted.
2. Coordination for continuation of utility services.
3. Use of elevator and stairs.
4. Locations of temporary partitions and means of egress.
5. Coordination of tenant's continuing occupancy of adjacent portions of existing building.

D. Predemolition Photographs or Videotape: Show existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

1.5 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 site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.6 PROJECT CONDITIONS

A. Tenants will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than **72** hours' notice to Owner or Tenant, of activities that will affect Owner's operations.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

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. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site will not be 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

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. 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.

C. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
1. Do not interrupt existing utilities serving occupied or operating facilities

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. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Protect existing site improvements, appurtenances, and landscaping to remain.

B. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

3.4 POLLUTION CONTROLS

A. Dust Control: Use temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
   1. Vacuum floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

C. Cleaning: 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.

3.5 SELECTIVE DEMOLITION

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. 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.
   2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   3. Dispose of demolished items and materials promptly.
   4. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.

3.6 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

C. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 01732

SECTION 01770 - CLOSEOUT PROCEDURES

1.1 GENERAL

A. Substantial Completion: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Obtain and submit releases permitting Owner unrestricted use of the Work
3. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
4. Deliver extra materials and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
5. Complete startup testing of systems.
6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
7. Complete final cleaning requirements, including touchup painting.
8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Substantial Completion Inspection: Submit a written request for inspection for Substantial Completion. Provide Architect with punch list of outstanding items noted prior to request. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

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

C. Final Completion: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

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

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

E. List of Incomplete Items (Punch List): Submit **three** copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order,
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

F. Project Record Documents: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

G. Record Drawings: Maintain and submit three sets of blue- or black-line white prints of Contract Drawings as Record Documents. Submit One set of Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

   a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.

2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

H. Record Specifications: Submit three copies of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

1.2 PRODUCTS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1.3 EXECUTION

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

1. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition required by the Owner for continued operation. Comply with manufacturer's written instructions.
2. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

    a. Clean Project areas disturbed by construction activities
    b. Remove construction surplus material from Project site.
    c. Clean exposed interior hard-surfaced finishes to a dirt-free condition, free of stains.
    d. Remove debris and surface dust from limited access spaces.
    e. Clean transparent materials where dust from project has contaminated, including mirrors and glass.
    f. Remove labels that are not permanent.
    g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored.

        1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    h. Replace disposable air filters where return air grilles were affected by work..
    i. Clean light fixtures, lamps, globes, and reflectors in the project area.

B. Comply with safety standards for cleaning. Do not burn waste materials.. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site without delay and dispose of lawfully.

END OF SECTION 01770

SECTION 03301 - CAST-IN-PLACE CONCRETE (LIMITED APPLICATIONS)

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 specifies cast-in-place lightweight concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes at new ramp.

1.3 SUBMITTALS

A. General: In addition to the following, comply with submittal requirements in ACI 301.

B. Product Data: For each type of manufactured material and product indicated.

C. Design Mixes: For concrete mix.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

C. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

D. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.

1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
2. Steel reinforcement and supports.
3. Concrete mixtures.
4. Handling, placing, and constructing concrete.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.2 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

B. Light-Weight Aggregate: ASTM C 330, **1/2-inch** nominal maximum aggregate size.

C. Water: Potable and complying with ASTM C 94.

2.3 CURING MATERIALS

A. Water: Potable.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.4 CONCRETE MIXES

A. Structural Lightweight Concrete Mix: ASTM C 330, proportioned to produce concrete with a minimum compressive strength of **3000 psi (20.7 MPa)** at 28 days and a calculated equilibrium unit weight of **110 lb/cu. ft. (1762 kg/cu. m)** plus or minus 3 lb/cu. ft. (48.1 kg/cu. m), as determined by ASTM C 567. Concrete slump at point of placement shall be the minimum necessary for efficient mixing, placing, and finishing.

1. Limit slump to 4 inches for troweled slabs.

2.5 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with ASTM C 94 and ASTM C 1116.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Site mixed concrete may be used where work requires less than 3 cubic yards.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.

3.2 STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.3 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by Architect.

3.4 CONCRETE PLACEMENT

A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

B. Do not add water to concrete during delivery, at Project site, or during placement.

C. Consolidate concrete with mechanical vibrating equipment.

3.5 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Trowel Finish: Apply a trowel finish to slab surfaces followed by light brooming to create a slip-resistant surface.

3.6 TOLERANCES

A. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.7 CONCRETE PROTECTION 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 follow recommendations in ACI 305R for hot-weather protection during curing.

B. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

C. Curing Methods: Cure formed and unformed concrete for at least seven days by moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. 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 (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
2. 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.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article. Perform tests according to ACI 301.

3.9 REPAIRS

A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION 03301

SECTION 05310 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Floor Deck

B. Related Sections include the following:
   1. Division 5 Section "Cold Formed Steel Framing for supporting framing.

1.3 SUBMITTALS

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

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

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
   1. Mechanical fasteners.

F. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.
   1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
   2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

E. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

F. FM Listing: Provide steel roof deck evaluated by FM and listed in FM's "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Steel Deck:
      a. BHP Steel Building Products USA Inc.
      b. Consolidated Systems, Inc.
      c. Epic Metals Corp.
      d. Marlyn Steel Products, Inc.
      e. Nucor Corp.; Vulcraft Div.
      f. Roof Deck, Inc.
      g. United Steel Deck, Inc.
      h. Verco Manufacturing Co.
      i. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

2.2 COMPOSITE FLOOR DECK

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

   1. Prime-Painted Steel Sheet: ASTM A 611, with top surface phosphatized and unpainted and bottom surface shop primed with baked-on, lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.

2. Profile, Depth and Design Uncoated-Steel Thickness: as indicated on Structural Drawings.
3. Span Condition: as indicated.

2.3 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. 10 (4.8 mm) 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 (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

H. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level recessed pans of 1-1/2- inch (38-mm) minimum depth. For drains, cut holes in the field.

I. Shear Connectors: ASTM A 108, Grades 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B, with arc shields.

J. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.'

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate decking bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 FLOOR DECK INSTALLATION

A. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated per the structural drawings.

1. Weld Diameter: 3/4 inch (19 mm), nominal.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 36 inches (910 mm), and as follows:

1. Mechanically clinch except where a minimum of 1-1/2-inch- (38-mm-) long welds are noted.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches (51 mm), with end joints as follows:

1. End Joints: Lapped 4"

D. Shear Connectors: Weld shear connectors through deck to supporting frame according to AWS D1.1 and manufacturer's written instructions. Butt end joints of deck panels; do not overlap. Remove and discard arc shields after welding shear connectors.

E. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

F. 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 decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

G. Install piercing hanger tabs not more than 14 inches (355 mm) apart in both directions, within 9 inches (228 mm) of walls at ends, and not more than 12 inches (305 mm) from walls at sides, unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform field quality-control testing.

B. Field welds will be subject to inspection.

C. Shear connector stud welds will be inspected and tested according to AWS D1.1 for stud welding and as follows:
   1. Shear connector stud welds will be visually inspected.
   2. Bend tests will be performed if visual inspections reveal less than a full 360-degree flash or welding repairs to any shear connector stud.
   3. Tests will be conducted on additional shear connector studs if weld fracture occurs on shear connector studs already tested according to AWS D1.1.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Remove and replace work that does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
   1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. load-bearing wall framing.
2. Floor joist framing.

B. Related Sections include the following:
1. Division 9 Section "Gypsum Board Assemblies" for interior finishes

1.3 DEFINITIONS

A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.

B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.4 SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.

C. Mill certificates signed by steel sheet producer **or test reports from a qualified independent testing agency** indicating steel sheet complies with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

C. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

D. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" [**or "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members" and the following**] for calculating structural characteristics of cold-formed metal framing[.][:]

1. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:

1. Allied American Studco, Inc.
2. Consolidated Fabricators Corp.
3. Dietrich Industries, Inc.
4. Unimast, Inc.
5. United Metal Products, Inc.
6. Western Metal Lath.

2.2 MATERIALS

A. Steel Sheet: 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 (Z180)**

2.3 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness, Flange Width as indicated on drawings by reference to section type

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: **Matching steel studs**.
2. Flange Width: 1-1/4 inches (32 mm).

2.4 FLOOR JOIST FRAMING

A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, with stiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness and Flange Width: as indicated on drawings for type shown.

B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, complying with ASTM C 955, and as follows:

1. Minimum Uncoated-Steel Thickness: **Matching steel joists**.
2. Flange Width: **1-5/8 inches (41 mm) minimum.**

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi (230 MPa).

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. End clips.
5. Joist hangers and end closures.
6. Hole reinforcing plates.
7. Backer plates.

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.

B. Anchor Bolts: ASTM F 1554, Grade **36**, threaded carbon-steel 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. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

D. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: **SSPC-Paint 20 or DOD-P-2103**

B. 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, with fluid consistency and 30-minute working time.

2.8 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

   a. Comply with AWS D1.3 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, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies 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 (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) 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 (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

   a. Comply with AWS D1.3 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, with screw penetrating joined members by not less than three exposed screw threads.

E. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.

F. 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.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install 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.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 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 webs of top and bottom tracks. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: **As indicated**.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

E. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

F. 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.
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.

G. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, casework, 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.

H. Install horizontal bridging in stud system, spaced 48 **inches (1219 mm)** apart. Fasten at each stud intersection.
1. 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.

I. 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.

J. 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.

3.5 JOIST INSTALLATION

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:

1. Joist Spacing: **As indicated**.

D. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated.

E. Install bridging at each end of joists and at intervals indicated. Fasten bridging at each joist intersection as follows:
1. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

F. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

G. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.6 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 cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Bollards

1.3 SUBMITTALS

A. Product Data: For the following:

   1. Nonslip aggregates and nonslip-aggregate surface finishes.
   2. Paint products.
   3. Grout.

B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

   1. Provide templates for anchors and bolts specified for installation under other Sections.

C. Samples for Verification: For each type and finish of extruded nosing and tread.

D. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.

E. Welding Certificates: Copies of certificates for welding procedures and personnel.

F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. 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."
3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

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: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

C. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

2.4 FASTENERS

A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

E. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).

F. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

H. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.5 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 CONCRETE FILL

A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.7 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Shear and punch metals cleanly and accurately. Remove burrs.

C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. 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.

E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Remove sharp or rough areas on exposed traffic surfaces.

K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.8 PIPE BOLLARDS

A. Fabricate pipe bollards from Schedule 40 steel pipe, galvanized for exterior application.

2.9 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.

2.10 STEEL AND IRON FINISHES

A. 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): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

B. 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," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.

B. 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.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. 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.

E. 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.

3.2 INSTALLING PIPE BOLLARDS

A. Bollards mounted on post tensioned concrete must be anchored with expansion anchors placed in location to avoid contact with post-tensioned cables in deck slab

B. Fill bollards solidly with concrete, mounding top surface.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed 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 (0.05-mm) dry film thickness.

END OF SECTION 05500

SECTION 06105 - MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Wood nailers, and blocking.

1.3 DEFINITIONS

A. Miscellaneous Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:

1. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.

C. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

D. Warranty of chemical treatment manufacturer for each type of treatment.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

B. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fire-retardant-treated wood product from one source and by a single producer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Fire-Retardant-Treated Materials, Interior Type A:

a. Baxter: J. H. Baxter Co.
b. Chemical Specialties, Inc.
c. Continental Wood Preservers, Inc.
d. Hickson Corp.
e. Hoover Treated Wood Products, Inc.

2.2 LUMBER, GENERAL

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
1. WCLIB - West Coast Lumber Inspection Bureau.
2. WWPA - Western Wood Products Association.

C. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Research or Evaluation Reports: Provide fire-retardant-treated wood acceptable to authorities having jurisdiction and for which a current model code research or evaluation report exists that evidences compliance of fire-retardant-treated wood for application indicated.

B. Interior Type A: For interior locations, use chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:

1. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by a qualified independent testing agency.
2. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
3. Contact with treated wood does not promote corrosion of metal fasteners.

2.4 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No.2 grade per SPIB;

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. Provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.
E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)

F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
2. Published requirements of metal framing anchor manufacturer.

E. 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; predrill as required.

3.2 WOOD NAILERS AND BLOCKING,

A. Install wood nailers, blocking, where shown and where required for attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

END OF SECTION 06105

SECTION 06402 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Wood cabinets.
   2. Plastic-laminate cabinets.
   3. Plastic-laminate countertops.
   4. Solid surface countertops.
   5. Metal Facings and Accents
   6. Shop finishing interior woodwork.

B. Related Sections include the following:

   1. Division 6 Section "Miscellaneous Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
   2. Division 8 Section "Flush Wood Doors."

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, **including cabinet hardware and accessories, and finishing materials and processes**.

B. Product Data: For **hardboard, medium-density fiberboard, particleboard, plywood, high-pressure decorative laminate, adhesive for bonding plastic laminate, thermoset decorative overlay, solid-surfacing material, cabinet hardware and accessories, and finishing materials and processes**.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

   1. Show details full size.
   2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

3. Show locations and sizes of cutouts and holes for items installed in architectural woodwork.

D. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Shop-applied transparent finishes.
2. Plastic laminates.
3. Thermoset decorative overlays.
4. Solid-surfacing materials.

E. Samples for Verification: For the following:

1. Solid Wood for transparent finish, **50 sq. in. (300 sq. cm)**for each species and cut, finished on 1 face and 1 edge.
2. Veneer leaves representative of and selected from flitches approved by Architect, to be used for transparent-finished woodwork.
3. Wood-veneer-faced panel products with or for transparent finish, 12 **by 12 inches** for each species and cut. Include at least one face-veneer seam and finish as specified.
4. Plastic-laminate-clad panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish **laminated on two adjoining edges with 3mm PVC edgebanding of matching color, with separate samples of unfaced panel product used for core.**
5. Thermoset decorative-overlay surfaced panel products, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish **laminated on two adjoining edges with 3mm PVC edgebanding of matching color**
6. Solid-surfacing materials, 6 inches (150 mm) square.
7. Miter joints for standing trim.

8. Exposed cabinet hardware and accessories, one unit for each type **[and finish]**.

F. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production **and installation** of interior architectural woodwork .

D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" Eighth Edition Version 1.3, 2003 for grades of interior architectural woodwork, construction, finishes, and other requirements.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish "hold to" dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Species and Cut for Transparent Finish: Maple as shown

C. Wood Products: Comply with the following:

1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade M**D-Exterior Glue**.
3. Particleboard: ANSI A208.1, Grade **M-2-Exterior Glue**.
4. Softwood Plywood: DOC PS 1, **Medium Density Overlay**.
5. Hardwood Plywood and Face Veneers: HPVA HP-1.

D. Thermoset Decorative Overlay: Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
1. Manufacturer: provide high-pressure decorative laminates to match scheduled standards

F. Stainless Steel: Grade and type designated below for each form required:
1. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
2. Bars and Shapes: ASTM A 276, Type 304.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware."

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, **170** degrees of opening**, self-closing**.

D. Back-Mounted Pulls: BHMA A156.9, B02011.

E. Wire Pulls: Back mounted,

F. Adjustable Shelf Standards and Supports: **BHMA A156.9, B04071; with shelf rests, B04081**

G. Shelf Rests: BHMA A156.9, B04013.

H. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:

1. Box Drawer Slides: **100 lbf (440 N)**.

I. Door Locks: BHMA A156.11, E07121. provide for all doors unless otherwise shown

J. Drawer Locks: BHMA A156.11, E07041. provide for all drawers unless otherwise shown

K. Grommets for Cable Passage through Countertops**2-inch (51-mm)**OD, **black**, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "**OG** series" by Doug Mockett and Co., Inc.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.4 FABRICATION, GENERAL

A. Interior Woodwork Grade: **Premium**

B. Wood Moisture Content: 6 to 8 percent in relation to ambient relative humidity during fabrication and in installation areas.
   1. Fabricate woodwork to dimensions, profiles, and details indicated.

C. Complete fabrication, including assembly, **finishing,** and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

   1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
   2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

D. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

   1. Seal edges of openings in countertops with two coats of waterproof sealer.

2.5 WOOD CABINETS FOR TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets.

B. Grade: **Premium**.

C. AWI Type of Cabinet Construction: A**s indicated**.

D. Wood Species and Cut for Exposed Surfaces: **As indicated**.

1. Grain Matching **As indicated.**
2. Matching of Veneer Leaves: As indicated.

E. Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: **Compatible species to that indicated for exposed surfaces, stained to match.**
2. Drawer Sides and Backs: **Solid-hardwood lumber, stained to match species indicated for exposed surfaces.**
3. Drawer Bottoms: **Thermoset decorative overlay.**

F. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.6 METAL FACINGS AND ACCENTS

A. Aluminum Sheet: Flat sheet complying with ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of alloy 5005-H32.

B. Fabricate metal panels to withstand 100 lbf/sq. ft. (4.8 kN/sq. m) or a concentrated load of 300 lbf (1.3 kN) on an area of 4 sq. in. (26 sq. cm), whichever produces the greater stress, without exceeding the allowable design working stress of materials involved, including anchors and connections, and without exhibiting permanent deformation in any components.

C. Fabricate cabinet facings from metal of type and thickness indicated below.

Brushed anodized finish to match ceiling panels and decorative trellis. Perforated pattern of ¼ inch squares at ½ inch on center to match radisued ceiling panels

D. Incorporate stiffeners or laminated backing using noncombustible materials as needed for strength and rigidity.

1. Fill space between stiffeners with sound-deadening insulation attached to face sheet with insulation adhesive, unless otherwise indicated.

E. Countertop supports: Extruded Bars and Shapes: ASTM B 221 (ASTM B 221M), Alloy 6063-T5/T52.

2.7 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.

B. Grade: **Premium**

C. AWI Type of Cabinet Construction: **Flush overlay,** unless otherwise indicated.

D. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: **HGS.**
2. Postformed Surfaces: **HGP.**
3. Vertical Surfaces: **HGS.**

4. Edges: 3mm PVC edging of color matching plastic laminate, applied by hot-press edgebander.

E. Materials for Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other Than Drawer Bodies: **Thermoset decorative overlay.**
2. Drawer Sides and Backs: **Solid-hardwood lumber.**
3. Drawer Bottoms: **Thermoset decorative overlay.**

F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Match color, pattern, and finish as indicated on drawings.

G. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.8 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

B. Grade: **Premium**

C. High-Pressure Decorative Laminate Grade: **HGS.**

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Match color, pattern, and finish as indicated on drawings.

E. Edge Treatment: Laminate edge to substrate before top, except for postformed tops..

F. Core Material: **Particleboard or medium-density fiberboard. Water-Resistant Particleboard made with exterior glue at sinks.**

2.10 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for countertops

B. Grade: **Premium.**

C. Solid-Surfacing-Material Thickness: **3/4 inch (19 mm).**

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

1. Match color, pattern, and finish as indicated

E. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing

2.11 SHOP FINISHING

A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.

B. Grade: **Premium**

C. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

D. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

1. Sand exposed sold wood and veneered surfaces with 220 grit for finish preparation. Veneer sand-through is unacceptable

2. Repair and conceal all grain separation, endgrain, chip-out blush, millmarks, sanding scratches and other blemishes due to milling and fabrication, on all exposed wood surfaces prior to finishing.

3. Render finish brad fastening points unnoticeable. Use of wood putty is unacceptable

4. Backpriming: Apply two coats of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative overlay.

E. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:

1. Grade: **Premium**
2. AWI Finish System TR-4: Conversion varnish.
3. Staining: not required

4. Sheen: **Satin, 30-50** gloss units.

PART 3 - EXECUTION

3.1 PREPARATION

A. Stabilize and maintain temperature within occupancy range, and humidity within 25 and 55% at least one week prior to the date of jobsite arrival for the architectural woodwork.

B. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWI Section 1700

B. Grade: **Premium**

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

D. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.

E. Cabinets: Install without distortion so 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 installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of wood cabinets with transparent finish, from cabinet to cabinet.
3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with **No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood or metal framing, blocking, or hanging strips**

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
3. Secure backsplashes **to tops with concealed metal brackets at 16 inches (400 mm) o.c.** .

G. Metal Panels: Locate and place ornamental formed-metal items level and plumb and in alignment with adjacent construction.
1. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where needed to protect metal surfaces
2. Form tight joints with exposed connections accurately fitted together. Provide reveals as indicated.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06402

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes joint sealants for the following locations:

1. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:

   a. Perimeter joints between interior wall surfaces and frames of interior doors .
   b. All open joints where differing materials abut or where open joints are created by new construction.

B. Related Sections include the following:
   a. Division 9 Section "Gypsum Board Assemblies".

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, 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. Colors: Provide color of exposed joint sealants to comply with the following:

1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.

1. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Joint Sealant Data Sheet, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for Uses indicated.

B. Products: Subject to compliance with requirements, provide one of the products specified in each Elastomeric Joint Sealant Data Sheet.

2.3 LATEX JOINT SEALANTS

A. General: Provide manufacturer's standard one-part, nonsag, mildew-resistant, paintable latex sealant of formulation indicated that is recommended for exposed applications on

interior and protected exterior locations and that accommodates indicated percentage change in joint width existing at time of installation without failing either adhesively or cohesively.

2.4 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. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as 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.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

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 in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with 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. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer 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.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer. Apply primer to comply with joint sealant manufacturer's recommendations. 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 printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Latex Sealant Installation Standard: Comply with requirements of ASTM C 90 for use of latex sealants.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

   a. Do not leave gaps between ends of joint fillers.
   b. Do not stretch, twist, puncture, or tear joint fillers.
   c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 62, unless otherwise indicated.

   a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved 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 or from damage resulting from construction operations or other causes so that they 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 that and installations with repaired areas are indistinguishable from original work.

ELASTOMERIC JOINT SEALANT DATA SHEET

Interior Joints – including , but not limited to, Door Frame edges, non-moving joints

A. Acrylic Emulsion Sealant: Provide product complying with ASTM C 834 for perimeter joints subject to limited movement

B. Products: Subject to compliance with requirements, provide one of the following:

1. Acrylic-Emulsion Sealant:

a. "AC-20," Pecora Corp.
b. "Sonolac," Sonneborn Building Products Div., ChemRex, Inc.
c. "Tremco Acrylic Latex 834," Tremco, Inc.

END OF SECTION 07920

SECTION 08110 - STEEL DOOR FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Steel Door Frames

B. Related Sections include the following:

1. Division 8 Section "Flush Wood Doors" for wood doors installed in steel frames.
2. Division 8 Section "Door Hardware" for door hardware
3. Division 8 Section "Glazing" for interior view panels.
4. Division 9 Section "Gypsum Board Assemblies" for steel-framed gypsum board partitions.
5. Division 9 Section "Painting" for field painting factory-primed doors and frames.

1.3 DEFINITIONS

A. Steel Sheet Thicknesses: Thickness dimensions, including those referenced in ANSI A250.8, are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic-coated steel sheets.

1.4 SUBMITTALS

A. Product Data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details and finishes.

B. Shop Drawings: Show the following:
1. Frame details for each frame type including dimensioned profiles.
2. Details and locations of reinforcement and preparations for hardware.
3. Details of each different wall opening condition.
4. Details of anchorages, accessories, joints, and connections.

C. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.5 QUALITY ASSURANCE

A. Steel Door Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver door frames cardboard-wrapped or crated to provide protection during transit and job storage.

B. Inspect frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.

C. Store frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Steel Door Frames:

a. Amweld Corporation

b. Benchmark Commercial Doors; a division of General Products Co., Inc.
c. Ceco Door Products; a United Dominion Company.
d. Kewanee Corporation (The).
e. Pioneer Industries Inc.
f. Republic Builders Products.
g. Steelcraft; a division of Ingersoll-Rand.

2.2 MATERIALS

A. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.

2.3 FRAMES

A. General: Provide steel frames for doors and sidelights, that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.

B. Frames of 0.063-inch- 16 gauge thick steel sheet for:
1. Wood doors, unless otherwise indicated.

C. Door Silencers: fabricate stops to receive three silencers on strike jambs of single-door frames.

D. Plaster Guards: Provide 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.

E. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick, electrolytic zinc-coated or metallic-coated steel sheet.

F. Inserts, Bolts, and Fasteners: Manufacturer's standard units.

2.4 FABRICATION

A. General: Fabricate steel frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

B. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

C. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

D. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

E. Hardware Preparation: Prepare frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

F. Frame Construction: Fabricate frames to shape shown.

1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
2. Provide welded frames with temporary spreader bars.

G. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

H. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

2.5 FINISHES

A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install steel frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.

3.2 ADJUSTING AND CLEANING

A. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

END OF SECTION 08110

SECTION 08211 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

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.

B. Related Sections include the following:
1. Division 8 Section Steel Door Frames" for frames to receive wood doors.
2. Division 8 Section 'Aluminum Storefront" for interior aluminum doors.
3. Division 8 Section "Finish Hardware" for operating components.

1.3 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction,

1. 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.

C. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.

D. Samples for Verification: As follows:

1. Corner sections of doors approximately 8 by 10 inches (200 by 250 mm) with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with the following standard:

1. NWMA Quality Standard: NWMA I.S.1-A, "Architectural Wood Flush Doors."
2. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for Finishing , handling and installation requirements

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
1. Individually package doors in cardboard cartons and wrap bundles of doors in plastic sheeting.

B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not comply with tolerances in referenced quality standard.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
2. Warranty shall be in effect during the following period of time after the date of Substantial Completion:
   a. Solid-Core Interior Doors: Life of 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, the following:

1. Flush Wood Doors:

   a. Algoma Hardwoods Inc.
   b. Buell Door Co.
   c. Eggers Industries; Architectural Door Division.
   d. Graham Manufacturing Corp.
   e. Ideal Wood Products, Inc.
   f. IPIK Door Co., Inc.
   g. Oshkosh Doors Inc
   h. V-T Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

A. Doors for Transparent Finish: Comply with the following requirements:

1. Grade: Premium (Grade AA faces).
2. Faces:Veneer as indicated on drawings.
3. Match between Veneer Leaves: Book match.
4. Match within Door Faces: Balance match.
5. Pair and Set Match: Provide for pairs of doors and for doors hung in adjacent sets.

   a. Comply with requirements in Division 6 Section "Interior Architectural Woodwork."

2.3 SOLID-CORE DOORS

A. Particleboard Cores: Comply with the following requirements:

1. Particleboard: ANSI A208.1, Grade LD-1.
2. Blocking: Provide wood blocking at particleboard-core doors as follows:

   a. 5-inch (125-mm) top-rail blocking, at doors indicated to have closers.
   b. 5-inch (125-mm) bottom-rail blocking, at exterior doors and doors indicated to have kick, mop, or armor plates.
   c. 5-inch (125-mm) midrail blocking, at doors indicated to have exit devices.

B. Interior Veneer-Faced Doors: Comply with the following requirements:

1. Core: Particleboard core.
2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of 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 measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.

1. Grade: Premium.
2. Finish: Manufacturer's standard finish with performance requirements comparable to AWI System TR-6 catalyzed polyurethane.
3. Staining: Match Architect's sample and building standard.
4. Effect: Semifilled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine 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 plumb jambs and level heads.
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 8 Section "Door Hardware."

B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, 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.

3.3 ADJUSTING AND PROTECTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08211

SECTION 08311 - ACCESS DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following types of access door:

1. Ceiling access door.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 9 Section "Gypsum Board Assemblies" for gypsum board walls and ceilings.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain access doors for entire Project from one source and by a single manufacturer.

1.4 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Acudor Products Inc.
2. Babcock-Davis Hatchways, Inc.
3. Bilco Co.
4. Dur-Red Products.
5. Karp Associates, Inc.
6. Milcor, Inc.

2.2 MATERIALS

A. Steel Sheet: ASTM A 366/A 366M commercial-quality, cold-rolled steel sheet with baked-on, rust-inhibitive primer.

B. Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Electrolytic zinc-coated steel sheet with Class C coating and phosphate treatment to prepare surface for painting.

C. Gaskets: Manufacturer's standard tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

2.3 ACCESS DOORS

A. Flush Access Doors with Concealed Trim: Units consisting of frame with concealed trim, door, hardware, and complying with the following requirements:

1. Frame: 0.0598-inch- (1.52-mm-) thick steel sheet.
2. Door: 0.0747-inch- (1.90-mm-) thick zinc-coated steel sheet at doors in shower room ceilings.
3. Trim: Flange integral with frame, 3/4 inch (19 mm) wide, for mud embedment in adjacent surface.
4. Hinge: Continuous type.
5. Locks: Flush, key-operated cylinder lock.

2.4 FABRICATION

A. General: Manufacture each access door assembly as an integral unit ready for installation.

B. Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. For gypsum board assemblies, furnish frames with edge trim for gypsum board or gypsum base.

C. Locking Devices: Furnish one key-operated cylinder lock per door and flush, screwdriver-operated cam locks in number required to hold door in flush smooth plane when closed; if only one locking device is required to hold door as indicated above, provide only the key operated cylinder lock.

1. For cylinder lock, furnish 2 keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 PREPARATION

A. Advise Installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

3.2 INSTALLATION

A. Comply with manufacturer's instructions for installing access doors.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.

C. Isolation: Where metal surfaces of units are to be installed in contact with incompatible metal or corrosive substrates, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

D. Install concealed-frame access doors flush with adjacent finish surfaces.

3.3 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08311

SECTION 08410 - ALUMINUM ENTRANCES - INTERIOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Interior entrances and Vestibules

B. Related sections include the following:

1. Division 7 Section "Joint Sealants" for joint sealants installed as part of aluminum entrance and storefront systems.
2. Division 8 Section "Glazing."

1.3 SYSTEM DESCRIPTION

A. General: Provide aluminum entrance and storefront systems capable of withstanding loads and thermal and structural movement requirements indicated without failure, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project. Failure includes the following:

1. Air infiltration and water penetration exceeding specified limits.
2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing units.

B. Glazing: Physically and thermally isolate glazing from framing members.

C. Thermally Broken Construction: Provide systems that isolate aluminum exposed to exterior from aluminum exposed to interior with a material of low thermal conductance.

D. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.

E. Dead Loads: Provide entrance- and storefront-system members that do not deflect an amount which will reduce glazing bite below 75 percent of design dimension when carrying full dead load.

1. Provide a minimum 1/8-inch (3.18-mm) clearance between members and top of glazing or other fixed part immediately below.
2. Provide a minimum 1/16-inch (1.59-mm) clearance between members and operable windows and doors.

F. Live Loads: Provide entrance and storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.

G. Air Infiltration: Provide entrance and storefront systems with permanent resistance to air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. (0.3 L/s/sq. m) of fixed wall area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75.2 Pa).

H. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward-acting wind-load design pressure as defined by ASCE 7, "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. (299 Pa). Water leakage is defined as follows:

1. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.

I. Thermal Movements: Provide entrance and storefront systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

J. Structural-Support Movement: Provide entrance and storefront systems that accommodate structural movements including, but not limited to, sway and deflection.

K. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.1.

L. Average Thermal Conductance: Provide storefront systems with average U-values of not more than 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) when tested according to AAMA 1503.1.

M. Dimensional Tolerances: Provide entrance and storefront systems that accommodate dimensional tolerances of building frame and other adjacent construction.

1.4 SUBMITTALS

A. Product Data: For each product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.

B. Shop Drawings: For entrance and storefront systems. Show details of fabrication and installation, including plans, elevations, sections, details of components, provisions for expansion and contraction, and attachments to other work.

1. For entrance systems, include hardware schedule and indicate operating hardware types, quantities, and locations.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

D. Samples for Verification: Of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

E. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of entrance and storefront systems with requirements based on comprehensive testing of current systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.

1. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Testing Agency Qualifications: Demonstrate to Architect's satisfaction, based on Architect's evaluation of criteria conforming to ASTM E 699, that the independent testing agency has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.

C. Source Limitations: Obtain each type of entrance and storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of entrance and storefront systems and are based on the specific systems indicated. Other manufacturers' systems with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

1. Do not modify intended aesthetic effect, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating systems without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.7 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of entrance and storefront systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures including, but not limited to, excessive deflection.
2. Failure of system to meet performance requirements.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Failure of operating components to function normally.
5. Water leakage through fixed glazing and frame areas.

C. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Arch Amarlite.
2. Butler Manufacturing Company; Vistawall Architectural Products.
3. EFCO Corporation.
4. Kawneer Company, Inc.
5. Tajima Corporation.
6. Tubelite Architectural Systems.
7. YKK AP America Inc.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).
5. Welding Rods and Bare Electrodes: AWS A5.10.

B. Steel Reinforcement: Complying with ASTM A 36 (ASTM A 36M) for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot-rolled sheet and strip.

C. Glazing as specified in Division 8 Section "Glazing."

D. Glazing Gaskets: Manufacturer's standard pressure-glazing system of black, resilient glazing gaskets, setting blocks, and shims or spacers, fabricated from an elastomer of type and in hardness recommended by system and gasket manufacturer to comply with system performance requirements. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.

E. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.

F. Sealants and joint fillers for joints at perimeter of entrance and storefront systems as specified in Division 7 Section "Joint Sealants."

G. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.3 COMPONENTS

A. Doors: Provide manufacturer's standard 1-3/4-inch- (44.5-mm-) thick glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie-rods.

1. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on extruded-aluminum glazing stops and preformed gaskets.
2. Stile Design: Medium Stile 3 inches wide.

B. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Reinforce members as required to retain fastener threads.
2. Do not use exposed fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing, compatible with adjacent materials, and of type recommended by manufacturer.

2.4 HARDWARE

A. General: Provide heavy-duty hardware units indicated in sizes, number, and type recommended by manufacturer for entrances indicated. Finish exposed parts to match door finish, unless otherwise indicated.

B. Butt Hinges: Manufacturer's standard with stainless-steel bearings between knuckles;

C. Closers, General: Comply with manufacturer's recommendations for closer size, depending on door size, exposure to weather, and anticipated frequency of use.

1. Closing Cycle: Comply with requirements of authorities having jurisdiction or the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," whichever are more stringent.
2. Opening Force: Comply with the following maximum opening-force requirements for locations indicated:

a. Interior Doors: 5 lbf (22.2 N).

D. Surface-Mounted Overhead Closers: ANSI/BHMA A156.4, Grade 1. Provide cover and the following:
1. Mounting: Parallel arm.
2. Hold Open: Automatic, at angle selected by Architect from manufacturer's standard options.
3. Back Check: Adjustable.

E. Door Stops: ANSI/BHMA A156.16, Grade 1, floor- or wall-mounted door stop, as appropriate for door location indicated, with integral rubber bumper.

F. Cylinders: As specified in Division 8 Section "Door Hardware."

G. Thumb Turns: Manufacturer's standard cast-aluminum-alloy, inside thumb-turn cylinders.

H. Cylinder Guard: Manufacturer's standard hardened-steel security ring with retainer plate for inside stile wall that protects lock cylinder from removal by wrenches, prying, or sawing.

I. Deadlock: Manufacturer's standard mortise deadlock with minimum 1-inch- (25.4-mm-) long throw bolt and complying with ANSI/BHMA A156.5, Grade 1 requirements.

J. Lockset Faceplates: Manufacturer's standard extruded-aluminum faceplate for lock type indicated that lays flush with door stile.

1. Provide radiused faceplate with weather sweep extending full length of lock at meeting stiles of pairs of doors.

K. Flat Face Strikes: Manufacturer's standard stainless-steel, flat face strike with steel mounting plate and black-plastic dustbox.

L. Pull Handles: As selected by Architect from manufacturer's full range of pull handles and plates.

M. Push Bars: As selected by Architect from manufacturer's full range of full-door-width, single-bar push bars.

1. Provide push plate affixed to push bar.

2.5 FABRICATION

A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

C. Prepare components to receive concealed fasteners and anchor and connection devices.

D. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

E. Welding: Weld components to comply with referenced AWS standard. Weld before finishing components to greatest extent possible. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

F. Glazing Channels: Provide minimum clearances for thickness and type of glass indicated according to FGMA's "Glazing Manual."

G. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Storefront: Fabricate framing in profiles indicated. Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

I. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

   1. Interior Doors: Provide ANSI/BHMA A156.16 silencers at stops to prevent metal to metal contact. Provide 3 silencers on strike jamb of single-door frames and 2 silencers on head of double-door frames.

2.6 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. 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.

C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.\

D. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.

B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. 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 and condensation and moisture occurring or migrating within the system to the exterior.

D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."

E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.

F. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.

1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.

G. Install glazing to comply with requirements of Division 8 Section "Glazing," unless otherwise indicated.

H. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.

I. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:

1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.

2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm). Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.3 ADJUSTING AND CLEANING

A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

B. Remove excess sealant and glazing compounds, and dirt from surfaces.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08410

SECTION 08710 – FINISH HARDWARE

PART I – GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. The work in this section includes furnishing all items of finish hardware as hereinafter specified or obviously necessary for all swinging, sliding, folding and other doors. Except items, which are specifically excluded from this section of the specification or of unique hardware, specified in the same sections as the doors and frames on which they are installed.

B. RELATED DOCUMENTS

1. Related documents, drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 specification sections apply to this section.

C. RELATED SECTIONS

1. 08110 – Hollow Metal Doors and Frames
2. 08210 – Flush Wood Doors
3. 08410 – Aluminum Doors and Frames
4. Division 16 – Electrical

1.02 REFERENCES

A. STANDARDS

1. ANSI A156.1 – Butts and Hinges
2. ANSI A156.2 – Bored Locks and Latches
3. ANSI A156.3 – Exit Devices
4. ANSI A156.4 – Door Controls – Door Closers
5. ANSI A156.5 – Auxiliary Locks and Associated Products
6. ANSI A156.6 – Architectural Door Trim
7. ANSI A156.7 – Template Hinge Dimensions
8. ANSI A156.8 – Door Controls – Overhead Holders
9. ANSI A156.13 – Mortise Locks and Latches
10. ANSI A156.15 – Closer Holder Release Devices
11. ANSI A156.16 – Auxiliary Hardware
12. ANSI A156.18 – Material and Finishes
13. NFPA80 – Fire Doors and Windows
14. UL10C – Positive Pressure Fire Tests of Door Assemblies

B. CODES

1. NFPA 101 – Life Safety Code
2. IBC 2003 – International Building Code
3. ANSI A117.1 – Accessible and Usable Buildings and Facilities
4. ADA – Americans with Disabilities Act

1.03 SUBMITTALS

A. GENERAL REQUIREMENTS

1. Submit copies of finish hardware schedule in accordance with Division 1, General Requirements.

B. SCHEDULES AND PRODUCT DATA

1. Schedules to be in vertical format, listing each door opening, and organized into "hardware sets" indicating complete designations of every item required for each door opening to function as intended. Hardware schedule shall be submitted within two (2) weeks from date the purchase order is received by the finish hardware supplier. Furnish four (4) copies of revised schedules after approval for field and file use. Note any special mounting instructions or requirements with the hardware schedule. Schedules to include the following information:

   a. Location of each hardware set cross-referenced to indications on drawings, both on floor plans and in door and frame schedule.
   b. Handing and degree of swing of each door.
   c. Door and frame sizes and materials.
   d. Keying information.
   e. Type, style, function, size, and finish of each hardware item.
   f. Elevation drawings and operational descriptions for all electronic openings.
   g. Name and manufacturer of each hardware item.
   h. Fastenings and other pertinent information.
   i. Explanation of all abbreviations, symbols and codes contained in schedule
   j. Mounting locations for hardware when varies from standard.

2. Submit catalog cuts and/or product data sheets for all scheduled finish hardware.

3. Submit separate detailed keying schedule for approval indicating clearly how the owner's final instructions on keying of locks has been fulfilled.

C. SAMPLES

1. Upon request, samples of each type of hardware in finish indicated shall be submitted. Samples are to remain undamaged and in working condition through submittal and review process. Items will be returned to the supplier or incorporated into the work within limitations of keying coordination requirements.

D. TEMPLATES

1. Furnish a complete list and suitable templates, together with finish hardware schedule to contractor, for distribution to necessary trades supplying materials to be prepped for finish hardware.

E. OPERATIONS AND MAINTENANCE MANUALS

1. Upon completion of construction and building turnover, furnish two (2) complete maintenance manuals to the owner. Manuals to include the following items:

   a. Approved hardware schedule, catalog cuts and keying schedule.
   b. Hardware installation and adjustment instructions.
   c. Manufacturer's written warranty information.
   d. Wiring diagrams, elevation drawings and operational descriptions for all electronic openings.

1.04 QUALITY ASSURANCE

A. SUBSTITUTIONS

1. All substitution requests must be submitted before bidding and within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the architect and his hardware consultant.

B. SUPPLIER QUALIFICATIONS

1. A recognized architectural door hardware supplier who has maintained an office and has been furnishing hardware in the project's vicinity for a period of at least two (2) years.

2. Hardware supplier shall have office and warehouse facilities to accommodate this project.

3. Hardware supplier shall have in his employment at lease one (1) Architectural Hardware Consultant (AHC) who is available at reasonable times during business hours for consultation about the project's hardware and requirements to the owner, architect and contractor.

4. Hardware supplier must be an authorized factory distributor of all products specified herein.

1.05 FIRE-RATED OPENINGS

1. Provide door hardware for fire-rated openings that comply with NFPA80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed by Underwriter's Laboratories (UL) or Warnock Hersey (WH) for use on types and sizes of doors indicated.

2. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

   a. Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.

1.06 DELIVERY, STORAGE AND HANDLING

A. MARKING AND PACKAGING

1. Properly package and mark items according to the approved hardware schedule, complete with necessary screws and accessories, instructions and installation templates for spotting mortising tools. Contractor shall check deliveries against accepted list and provide receipt for them, after which he is responsible for storage and care. Any shortage or damaged good shall be made without cost to the owner.

2. Packaging of door hardware is the responsibility of the supplier. As hardware supplier receives material from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set and door numbers to match the approved hardware schedule. Two or more identical sets may be packed in same container.

B. DELIVERY

1. The supplier shall deliver all hardware to the project site; direct factory shipments are not allowed unless agreed upon beforehand. Hardware supplier shall coordinate delivery times and schedules with the contractor. Inventory door hardware jointly with representatives of

hardware supplier and hardware installer/contractor until each is satisfied that count is correct.

2. No keys, other than construction master keys and/or temporary keys are to be packed in boxes with the locks.

C. STORAGE

1. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of work will not be delayed by hardware losses both before and after installation.

1.07 WARRANTY

A. All items, except as noted below, shall be warranted in writing by the manufacturer against failure due to defective materials and workmanship for a minimum period of one (1) year commencing on the date of final completion and acceptance. In the event of product failure, promptly repair or replace item with no additional cost to the owner.

1. Mortise locksets: Five (5) years
2. Exit Devices: Five (5) years
3. Door closers: Ten (10) years
4. Securitron (and approved equals) electrified hardware: Lifetime

PART II – PRODUCTS

2.01 MANUFACTURERS

A. Only manufacturers as listed below shall be accepted. Obtain each type of finish hardware (hinges, latch and locksets, exit devices, door closers, etc.) from a single manufacturer.

2.02 MATERIALS

A. SCREWS AND FASTENERS

1. All required screws shall be supplied as necessary for securing finish hardware in the appropriate manner. Thru-bolts shall be supplied for exit devices and door closers where required by code and the appropriate blocking or reinforcing is not present in the door to preclude their use.

B. HANGING DEVICES

1. HINGES

a. Hinges shall conform to ANSI A156.1 and be five-knuckle design, ball bearing as specified with NRP (non-removable pin) feature, at all exterior reverse bevel doors. Unless otherwise scheduled, supply one (1) hinge for every 30" of door height. Hinges shall generally be 4 ½" x 4 ½", except at doors exceeding 36" in width where 5" x 4 ½" hinges shall be provided. Heavy weight hinges (.180) shall be supplied at all high traffic doors where specified. Provide hinges with phillips flat-head screws unless specified otherwise.

1) Specified Manufacturer: McKinney
2) Approved Substitutes: Bommer, Hager

C. FLUSH BOLTS AND ACCESSORIES

1. All manual and automatic flush bolts to be furnished as specified.

   a. Specified Manufacturer: McKinney
   b. Approved Substitutes: Rockwood, Trimco

D. CYLINDERS AND KEYING

1. CYLINDERS

   a. All cylinders shall meet the requirements of UL437 including those for pick and drill resistance. Pick resistance shall incorporate two or more independent locking mechanisms including a pin tumbler device with six top pin chambers with mushroom shaped driver pins and a coded sidebar locking mechanism operated independently from the six top pin tumbler device. Drill resistance shall incorporate cylinder housing with fixed in-place case-hardened inserts to protect the pin tumbler shear line, cylinder plugs with case-hardened inserts to protect the pin tumbler shear line and the side bar, mushroom shaped stainless steel driver pins and stainless steel sidepins. All cylinders shall be factory master keyed.

      1) Approved Manufacturers: Schlage,Assa Abloy, Best - to match existing system if required by Owner.

2. KEYING

   a. All locks and cylinders shall be construction master-keyed. All locks and cylinders to be master-keyed or grandmaster-keyed as directed by the owner. The factory shall key all locks and cylinders. Furnish the following key amounts:

      1) Two (2) change keys per lock
      2) Three (3) grand master keys
      3) Six (6) master keys per master level
      4) Fifteen (15) construction/temporary keys

   b. Master keys and all high-security or restricted keyway blanks shall be sealed in tamper-proof packaged boxes when shipped from the factory. The boxes shall be shrink wrapped and imprinted to ensure the integrity of the packaging.

3. KEY CABINET

   a. Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall expansion capacity of 150% of the number of locks required for the project.

      1) Specified Manufacturer: Telkee
      2) Approved Substitutes: Lund

4. KEY CONTROL SOFTWARE

   a. A comprehensive key management software package shall be supplied. Software package shall include free one year technical support and free upgrades to software as it

becomes available. Software shall have customized query, reporting and search capability and shall allow for tracking of all issued keys. Display of key-holder photographs and signatures shall be allowed.

1) Specified Manufacturers: Sargent Key Wizard
2) Approved Manufacturers: Corbin Russwin, Yale

E. LOCKING DEVICES

1. CYLINDRICAL LOCKSETS – HEAVY DUTY

a. All locksets shall exceed the requirements of ANSI 156.2 Series 4000, Grade 1 with all standard trim. Locks shall comply with UL10C and UBC 7-2 positive pressure requirements. Furnished with standard 2 3/4" backset. Lock housing shall be fabricated of steel zinc dichromate and stainless steel. Latchbolt shall be brass or stainless steel with a minimum 1/2" throw. Locks shall be non-handed and fully field reversible.

1) Specified Manufacturer: Schlage ND Series
2) Approved Substitutes: Corbin Russwin CL3300 Series, Sargent 10 Line, Yale 5400LN Series

F. EXIT DEVICES

1. CONVENTIONAL DEVICES

a. All exit devices shall be certified to meet ANSI/BHMA A156.3 Grade 1 requirements and shall be listed by Underwriters Laboratories and bear the UL label for life safety in full compliance with NFPA 80 and NFPA 101. Mounting rails shall be formed from a solid single piece of stainless steel, brass or bronze no less than 0.072" thick. Push rails shall be constructed of 0.062" thick material. Painted or anodized aluminum shall not be considered heavy duty and are not acceptable. Hex key dogging shall be standard for all life safety panic hardware. Lever trim shall be available in finishes and designs to match that of the specified locksets.

1) Specified Manufacturer: Von Duprin 98 Series
2) Approved Substitutes: Corbin Russwin ED4000/ED5000 Series, Sargent 80 Series, Yale 7100/7200 Series

G. DOOR CLOSERS

1. SURFACE MOUNTED CLOSERS – HEAVY DUTY

a. All closers shall have non-ferrous covers, aluminum alloy bodies, forged steel arms, and separate valves for adjusting backcheck, closing and latching cycles and adjustable spring to provide up to 50% increase in spring power. Closers shall be constructed with a one-piece body. Closers shall be furnished with parallel arms mounting on all doors opening into corridors or other public spaces and shall be mounted to permit 180 degrees door swing wherever wall conditions permit. Furnish with non-hold open arms unless otherwise indicated. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

1) Specified Manufacturer: LCN 4040 series
2) Approved Substitutes: Corbin Russwin 2000 Series, Norton 7500 Series, Sargent 351 Series

3) Yale 4400 Series

H. DOOR TRIM AND PROTECTIVE PLATES

1. Kick plates shall be .050 gauges and two (2) inches less full width of door, or as specified. Push plates, pull plates, door pulls and miscellaneous door trim shall be as shown in the hardware schedule.

   a. Specified Manufacturer: Rockwood
   b. Approved Substitutes: McKinney, Trimco

I. DOOR STOPS AND HOLDERS

1. WALL MOUNTED DOOR STOPS

   a. Where a door is indicated on the plans to strike flush against a wall, wall bumpers shall be provided. Provide convex or concave design as indicated.

      1) Specified Manufacturers: Rockwood
      2) Approved Substitutes: McKinney, Trimco

2. OVERHEAD STOPS/HOLDERS

   a. Where specified, overhead stops as shown in the hardware sets are to be provided. Track, slide, arm and jamb bracket shall be constructed of extruded bronze and shock absorber spring shall be of heavy tempered steel. Overhead stops shall be of non-handed design.

      1) Specified Manufacturers: Rixson 1/2/9/10 Series
      2) Approved Substitutes: Sargent 690/1530/590/1540 Series

J. GASKETING AND THRESHOLDS

1. Provide continuous weatherseal on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide intumescent seals as required to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

2. Provide threshold units not less than 4" wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames. All threshold units shall comply with the Americans with Disabilities Act (ADA.)

   a. Specified Manufacturers: Pemko
   b. Approved Substitutes: McKinney, Reese, Zero

K. SILENCERS

1. Furnish rubber door silencers all hollow metal frames; two (2) per pair and three (3) per single door frame.

2.03 FINISHES

A. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

PART III – EXECUTION

3.01 EXAMINATION

A. Contractor shall ensure that the building is secured and free from weather elements prior to installing interior door hardware. Examine hardware before installation to ensure it is free of defects.

3.02 INSTALLATION

A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute (DHI.)

2. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. All hardware shall be applied and installed in accordance with best trade practice by an experienced hardware installer. Care shall be exercised not to mar or damage adjacent work.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

D. Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.03 FIELD QUALITY CONTROL

A. The hardware supplier shall do a final inspection prior to building completion to ensure that all hardware was correctly installed and is in proper working order.

B. Prior to the installation of hardware, manufacturer's representatives for locksets, closers, and exit devices shall arrange and hold a jobsite meeting to instruct the installing contractor's personnel on the proper installation of their respective products. A letter of compliance, indicating when this meeting is held and who is in attendance, shall be sent to the Architect and Owner.

3.04 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore to proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Instruct owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes and usage of any electronic devices.

3.05 PROTECTION

A. Contractor shall protect all hardware, as it is stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

3.06 HARDWARE SCHEDULE

A. The following schedule is furnished for whatever assistance it may afford the Contractor; do not consider it as entirely inclusive. Should any particular door or item be omitted in any scheduled hardware group, provide door or item with hardware same as required for similar purposes. Quantities listed are for each pair of doors, or for each single door.

B. Manufacturer's abbreviations used in Hardware Groups:

1. FA – Folger Adam
2. HS – HES
3. MC – McKinney
4. PE – Pemko
5. RO – Rockwood
6. RX – Rixson
7. SA – Sargent
8. SN – Securitron

3.07 HARDWARE GROUPS

HW-1 Passage Alum Doors 002A, 002C
3 Hinges
Mfrs Standard Push/Pull
Closer
Overhead Stops

HW-2 Passage Alum Doors 002B, 007A
6 Hinges
Mfrs Standard Push/Pull
Closers
Overhead Stops

HW-3 Office Doors 003
3 Hinges
Office Lockset
Coat Hook
Wall Stop

HW-4 Passage Doors 004, 005
3 Hinges
Passage Latchset
Wall Stop

HW-5 Passage Doors 008, 009, 010
3 Hinges
Passage Latchset
Closer
Kickplate omit Door 010
Wall Stop

HW-6 Storage doors 011
3 Hinges
Storage lockset
Closer
Wall Stop

HW-7 Egress Doors 012B, 014C
3 Hinges
Passage Latchset
Closer
Smoke Seals
Intumescent Seal if not provided by door mfr.
Kickplate
Wall Stop

HW-8 Egress Door 013
6 Hinges
Passage Latchset
Closers
Flush Bolts head and sill – inactive leaf
Wall Stops

HW-9 Storage Pair doors 014A, 014B
6 Hinges
Storage lockset
Surface Mounted Bolts head and sill - inactive leaf
Wall Stops

HW-10 Egress Doors 012A
3 hinges
Exit Device
Closer
Kickplate
Threshold
Smoke Seals
Weatherstrip at Sill

HW-11 Egress Doors 007B
3 hinges
Vertical Rod Exit Devices - Rated
Closers
Kickplates
Threshold
Smoke Seals

END OF SECTION 08710

SECTION 08800 – GLAZING

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 glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Vision lites – Insulated and etched for privacy

B. Related Sections:

1. Division 6 Section "Finish Carpentry" for wood frames supporting vision lites.
2. Division 8 Section "Flush Wood Doors" for glazed panels in wood doors.

1.3 DEFINITIONS

A. Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Glass Design: Provide glass lites for the various size openings in the thickness required to meet or exceed the following criteria:

1. Minimum glass thickness, nominally, of lites is 6.0 mm (0.23 inch).

1.5 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for each glass product and glazing material indicated.

C. Samples for verification purposes of 12-inch-square samples of each type of glass indicated except for clear monolithic glass products.

D. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.

1. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

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. FGMA Publications: "FGMA Glazing Manual."
2. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines".

B Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

1 Primary glass of each (ASTM C 1036) type and class indicated.
2. Heat-treated glass of each (ASTM C 1048) condition indicated.

C Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Install liquid sealants at ambient and substrate temperatures above 40 deg F (4.4 deg C).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide products specified in Product Data Sheets at end of this Section.

2.2 PRIMARY FLOAT GLASS PRODUCTS

A. Uncoated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below.

1. Kind FT (fully tempered) where indicated.

2.3 DECORATIVE GLASS

A. Sandblasted-Glass Units Ki**nd FT (fully tempered)**, and complying with other specified requirements.

1. Sandblasting Process: Abrade sandblasted glass evenly, with small particles of sand forced through a high-pressure air nozzle according to manufacturer's standard process.
2. Glass Thickness: 6**.0 mm minimum**.
3. Antifingerprint Coating: Protective coating **recommended and provided by glass fabricator**.

2.4 INSULATING GLASS

A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in the Insulating-Glass Schedule at the end of Part 3.

1. Provide Kind FT (fully tempered) where safety glass is indicated.

2. For etched glass provide sandblasted semi obscure glass or laminated patterned glass for exterior pane as selected by Architect. Ref Article Above.

B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule at the end of Part 3 are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

C. Sealing System: Dual seal, with primary and secondary sealants as follows:

1. Manufacturer's standard sealants.

D. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

1. Aluminum with mill or clear-anodized finish.
2. Desiccant: Molecular sieve or silica gel, or blend of both.
3. Corner Construction: Manufacturer's standard corner construction.

2.5 ELASTOMERIC GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
2. Suitability: Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.
3. Colors: Provide color of exposed joint sealants to comply with the following:

. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

2.6 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 involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore 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).

F. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonextruding, nonoutgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.

2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine glass framing, with glazier present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
2. Minimum required face or edge clearances.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined recommendations of manufacturers of glass, sealants, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass from edge damage during handling and installation as follows:

1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

C Apply primers to joint surfaces where required for adhesion of sealants.

D. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, 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 edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.

G. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

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 in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these 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 just before each lite 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.

3.5 PROTECTION AND CLEANING

A. Protect glass from breakage immediately after installation. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

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 them immediately as recommended by glass manufacturer.

C. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

D. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

ELASTOMERIC GLAZING SEALANT PRODUCT DATA SHEET

Base Polymer: Neutral-curing silicone.

Type: S (single component).

Grade: NS (nonsag).

Class: 25.

Additional Movement Capability: 50 percent movement in extension and 50 percent in compression for a total of 100 percent movement.

Uses Related to Exposure: NT (nontraffic).

Uses Related to Glazing Substrates: G, A, and, as applicable to glazing substrates indicated, O.

Use O Glazing Substrates: Coated glass, aluminum coated with a high-performance coating, galvanized steel, wood, elastomeric glazing gaskets and glazing accessories.]

Products:

A. "Dow Corning 795"; Dow Corning Corp.
B. "Silproof"; General Electric Corp.
C. "Spectrum 2"; Tremco, Inc.

INSULATING GLASS SCHEDULE

A. Coated Clear Float Glass: Where glass as designated below is indicated, provide Type 1 (clear, flat), Class 1 (clear) glass lites complying with the following:

Obscure Glass on panes as noted.

Coated Float Glass: Where glass as designated below is indicated, provide Class 2 (TINTED, coated heat and light reducing glass lites complying with the following:

a. Products: Viracon Ve2-85 HS/AN – VERIFY TO MATCH EXISTING THAT REMAINS

1. Visible Light Transmittance: 65%
2. Winter Nighttime U-Value: .31
3. Summer Daytime U-Value: .32
4. Solar Heat Gain Coefficient: .38
5. Outdoor Visible Reflectance: 10%
6. Coating Location: **Second surface**.
7. Coated Tinted Annealed Float Glass : Kind HS (heat strengthened), Condition C (other coated glass) where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with system performance requirements.
8. Coated Clear Fully Tempered Float Glass : Condition C (other coated glass), Kind FT (fully tempered) at areas in line of egress and /or subject to impact.

END OF SECTION 08800

SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Nonload-bearing steel framing members for gypsum board assemblies.
2. Gypsum board assemblies attached to steel framing.

1.3 DEFINITIONS

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.7 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

B. Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Steel Framing and Furring:

a. Clark Steel Framing, Inc.
b. Consolidated Systems, Inc.
c. Dale Industries, Inc.
d. Dietrich Industries, Inc.
e. Marino/Ware (formerly Marino Industries Corp.).
f. National Gypsum Co.; Gold Bond Building Products Division.
g. Unimast, Inc.

2. Gypsum Board and Related Products:

a. Domtar Gypsum.
b. Georgia-Pacific Corp.
c. National Gypsum Co.; Gold Bond Building Products Division.
d. Pabco Inc
e United States Gypsum Co.

2.2 GYPSUM BOARD PRODUCTS

A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.

1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).

B. Gypsum Wallboard: ASTM C 36 and as follows:

1. Type: Type X.
2. Edges: Tapered and featured (rounded or beveled) for prefilling.
3. Thickness: 5/8 inch (15.9 mm) where indicated.

2.3 TRIM ACCESSORIES

A. Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:

1. Material: Formed metal or plastic, with metal complying with the following requirement:

   a. Steel sheet zinc coated by hot-dip process or rolled zinc.

2. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:

   a. Cornerbead on outside corners, unless otherwise indicated.
   b. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.

2.4 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.

1. Use pressure-sensitive or staple-attached, open-weave, glass-fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.

C. Joint Compounds – provide one of the following types:

D. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.

1. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
4. For topping compound, use sandable formulation.

E. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

1. Ready-Mixed Formulation: Factory-mixed product.

   a. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
   b. Topping compound formulated for fill (second) and finish (third) coats.

c. All-purpose compound formulated for both taping and topping compounds.

2.5 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. Steel drill screws complying with ASTM C 1002 for the following applications:

1. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.

C. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

D. Resilient Mounting pads: For separating head channel from acoustical ceiling grid, provide dense elastomer pad continuous.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLING STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."

a. Install deflection track top runner to attain lateral support and avoid axial loading.

1) Attach jamb studs at openings to tracks using manufacturer's standard stud clip.

C. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.3 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.

1. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.

B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.

C. Extend partition framing to suspended ceilings.

D. Install steel studs and furring in sizes and at spacings indicated.

1. Single-Layer Construction: Space studs 16 inches (406 mm) o.c., unless otherwise indicated.

E. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.

1. Position studs vertically with open sides facing in same direction and engaging floor and ceiling runners. Begin and end each arc with a stud and space intermediate studs equally along arcs at stud spacing recommended by gypsum board manufacturer for radii indicated. Attach studs to runners with 3/8-inch- (9.5-mm-) long pan head framing screws. On straight lengths at ends of arcs, place studs 6 inches (150 mm) o.c. with last stud left free standing.

F. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Install 2 studs at each jamb, unless otherwise indicated.
2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

G. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

3.4 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

B. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

C. Locate both edge or end joints over supports. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.

D. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

E. Attach gypsum panels to framing provided at openings and cutouts.

F. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.

G. Isolate perimeter of nonload-bearing gypsum board partitions at abutments, except floors, as detailed.

H. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

I. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.5 GYPSUM BOARD APPLICATION METHODS

A. Single-Layer Application: Install gypsum wallboard panels as follows:
1. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of board.

B. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:

1. Fasten with screws.

3.6 INSTALLING TRIM ACCESSORIES

A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.

B. Install cornerbead at external corners.

C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
3. Install U-bead where indicated.

3.7 FINISHING GYPSUM BOARD ASSEMBLIES

A. General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

C. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.

D. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.

1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
2. Level 4 for gypsum board surfaces, unless otherwise indicated.

E. Use one of the following joint compound combinations as applicable to the finish levels specified:

1. Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Sandable, setting-type or drying type joint compound.

F. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.

3.8 CLEANING AND PROTECTION

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 09260

SECTION 09310 - CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Ceramic mosaic tile
2. Glazed wall tile.
3. Stone thresholds installed as part of tile installations.

B. Related Sections include the following:
1. Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.

1.5 SUBMITTALS

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

B. 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.

C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. Including custom cut-to-size pieces .
2. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches (300 mm) square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.
3. Full-size units of each type of trim and accessory **for each color and finish required**.
4. Stone thresholds in 6-inch (150-mm) lengths.

E. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

F. Product Certificates: For each type of product, signed by product manufacturer.

G. Qualification Data: For Installer.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all **tile of same type and color or finish** from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. 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.

C. 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. Stone thresholds.
2. Waterproofing.
3. Joint sealants.
4. Metal edge strips.

D. Mockups: Build mockups to **verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution**.

1. Build mockup of **each type of** floor and wall tile installation.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 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** in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 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.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: **Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following requirements apply for product selection:
1. 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. Variation beyond the design standards named will be extremely limited to maintain color palettes selected for the work.

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, unless otherwise indicated.

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:

Colors will be selected from Full Range of manufacturers products

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. Manufacturers: as Scheduled or as selected by Architect

B. Unglazed Ceramic Mosaic Tile: Factory-mounted flat tile as follows:

1. Composition: **Vitreous or impervious natural clay or porcelain.**
2. Surface: **Smooth, without** abrasive admixture at Toilet Rooms
3. **Slip-resistant, with** abrasive admixture at Showers
4. Module Size: as noted on Drawings
5. Nominal Thickness: 1/4 inch (6.35 mm).
6. Face: **Plain** with cushion edges.
7. Basis-of-Design Product: as scheduled on Drawings.

C. Glazed Wall Tile: Flat tile as follows:

8. Module Size: **as scheduled**
9. Thickness: 5/16 inch (8 mm).
10. Face: **Plain with modified square edges or cushion edges**
11. Finish: **Bright, opaque** glaze.
12. Mounting: Factory back-mounted.
13. Basis-of-Design Product: as scheduled on Drawings

D. Glazed Wall Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

1. Base for Thin-Set Mortar Installations: Straight, module size **4-1/4 by 4-1/4 inches (108 by 108 mm)**. 6 inches tall at walls without tile wainscots.
2. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size **4-1/4 by 4-1/4 inches (108 by 108 mm)**.
3. External Corners for Thin-Set Mortar Installations: Surface bullnose.
4. Internal Corners: Field-butted square corners except with coved base and cap angle pieces designed to fit with stretcher shapes.

2.4 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.

B. Stone Thresholds: ASTM C 503 with a minimum abrasion resistance of **10** per ASTM C 1353 or ASTM C 241 and with honed finish.

1. Description: Stone color and type as scheduled on drawings.

2.5 CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. General: Manufacturer's standard product that complies with ANSI A118.10.

B. Corrugated-Polyethylene Product: Corrugated polyethylene with dovetail-shaped corrugations for adhering to latex-portland cement mortar and with anchoring webbing on the underside; 39 inches (1000 mm) wide by 3/16-inch (4-mm) nominal thickness.

1. Available Product: Schluter Systems L.P.; DITRA.

2.6 SETTING AND GROUTING MATERIALS

A. Manufacturers:

1. MAPEI Corporation. UltraContact RS or equal

B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

C. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.
1. Polymer Type: Either ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
b. Sanded grout mixture for joints 1/8 inch (3.2 mm) and wider.

2.7 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

1. Products:

a. Dow Corning Corporation; Dow Corning 786.

b. GE Silicones; Sanitary 1700.
c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
d. Tremco, Inc.; Tremsil 600 White.

2.8 MISCELLANEOUS MATERIALS

A. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, designed specifically for flooring applications, **stainless steel; ASTM A 666, 300 Series** exposed-edge material. Equal to Schluter Schiene unless otherwise noted

B. Trowelable Underlayments and Patching Compounds: 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.

D. Grout Sealer: Manufacturer's standard **silicone** product for sealing grout joints that does not change color or appearance of grout. To be applied on all grout joints.

2.9 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 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. 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.

C. Field-Applied Temporary Protective Coating: Where needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 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: Lay tile in grid pattern, unless otherwise indicated. 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.

   1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to dimensions indicated. Verify dimensions comply with tile coursing.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

   1. Locate joints in tile surfaces directly above joints in concrete substrates.
   2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

H. 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.

3.4 CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

3.5 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. Paver tile installations.

B. Joint Widths: Install tile on floors with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).

C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

D. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.6 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 **latex-portland cement** 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.
3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

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.

3.7 TILE INSTALLATION SCHEDULE

A. Tile Type: Unglazed ceramic mosaic and porcelain tile on concrete slab
   1. Installation Method –TCA F113 (Dry Set Mortar over concrete subfloor – modified with uncoupling/cracksuppression membrane
   2. Setting Bed and Grout: ANSI A108.5 with the following mortar and grout:

      a. Polymer modified mortar.
      b. Sanded latex-portland cement grout at paver tile
      c. unsanded grout at small dimension tile

B. Tile Installation: Interior wall installation over gypsum board; thin-set mortar; TCA W243 and ANSI A108.5.

   1. Tile Type: **Glazed wall** tile
   2. Thin-Set Mortar:**Latex-** portland cement mortar.
   3. Grout: Polymer-modified unsanded grout.

END OF SECTION 09310

SECTION 09511 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

B. Related Sections include the following:

1. Division 9 Section for Metal Decorative Ceilings

1.3 SUBMITTALS

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

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension system members.
2. Method of attaching suspension system hangers to building structure.
3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
4. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

C. Samples for Verification: Each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

1. 6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.
2. Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

F. Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1. Obtain both acoustical ceiling panels and suspension system from the same manufacturer.

D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
2. Surface-burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components 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 panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

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 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.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units minimum 5 panels.
2. Suspension System Components: Quantity of 4 cross members.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated for each designation in the Acoustical Panel Ceiling Schedule at the end of Part 3.

2.2 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

C. Panel Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3, including those referencing ASTM E 1264 classifications.

2.3 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 ASTM C 635 requirements.

B. Metal Suspension System Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3.

C. 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.

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

1. Postinstalled 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 hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

F. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

3. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Comply with paint manufacturer's written instructions for applying and baking and for minimum dry film thickness.

   a. Organic Coating: Manufacturer's standard thermosetting coating system with a minimum dry film thickness of 0.8 to 1.2 mils (0.02 to 0.03 mm).
   b. Color: As selected by Architect from manufacturer's standard colors.

4. 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:

   a. Armstrong World Industries, Inc.
   b. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
   c. Chicago Metallic Corporation.
   d. USG Interiors, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and 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 other conditions affecting performance of acoustical panel ceilings.

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

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Where complete new system is required, 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 publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.

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. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
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; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
6. Do not attach hangers to steel deck tabs.
7. Attach hangers to structural members.
8. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

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 (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system

to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.

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 fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
   1. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   2. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 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.

3.5 ACOUSTICAL PANEL CEILING SCHEDULE

A. Water-Felted, Mineral-Base Acoustical Panels for Acoustical Panel Ceiling

Type 1 Ceiling Armstrong Dune

USG Pebbled Clima-Plus

1. Classification: Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 1 or 2 . .
2. Pattern: Panels fitting ASTM E 1264 pattern designation C E
3. Color: White
4. Light Reflectance Coefficient: Not less than LR 0.92
5. Noise Reduction Coefficient: NRC 0.70
6. Ceiling Attenuation Class: Not less than CAC 35.
7. Edge Detail: square
8. Thickness: 5/8 inch
9. Size: 24 by 24 inches (610 by 610 mm

D. Wide-Face, Capped, Double-Web, Steel Suspension System for Type 2 Ceilings Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G01 (Z001) coating designation, with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges; other characteristics as follows:

   a. Structural Classification Heavy-duty system
   b. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer
   a. Face Design: Flush face.
   b. Cap Material: Steel sheet
   c. Cap Finish: Painted white.

d. Mounting method: With compression struts as indicated for seismic loading.
e. Edge moldings: Hemmed Edge standard sized edge angle exposed with Armstrong BERC Clips or Chicago Metallic Seismic Retention Clip concealed in framing members if acceptable to Building Authority - or 2 inch hemmed edge angle per IBC requirements.

END OF SECTION 09511

SECTION 09513 – DECORATIVE METAL CEILING ASSEMBLY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Metal pan ceilings
2. Decorative trellis framing
3. Multi-strand cable supports
4. Design and Structural Calculations for system as shown.

B. Related Sections include the following:

1. Division 9 Section "Acoustical Panel Ceilings" for ceilings consisting of mineral-base acoustical panels and exposed suspension systems.

1.3 SUBMITTALS

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

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Joint pattern.
2. Ceiling suspension system members.
3. Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
4. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual acoustical metal pan tiles or sections of acoustical metal pan tiles and moldings showing the full range of colors, textures, and patterns available for each type of ceiling assembly indicated.

D. Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

1. 12-inch- (300-mm-) square, metal pan units.
2. 12-inch- (300-mm-) long samples of each exposed molding.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed metal pan ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Metal Pan Ceilings: Obtain each metal pan ceiling from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide metal pan ceilings that comply with the following requirements:

1. Fire-response tests performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
2. Surface-burning characteristics of metal pan ceilings comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.

D. Design Calculations: Provide calculations that show ceiling assembly will support code required loading without failure, and fasteners used will support lateral and physical loads created.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver metal pan units and suspension system components 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.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install metal pan ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, and work above ceilings is complete.

1.7 COORDINATION

A. Coordinate layout and installation of metal pan ceilings with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Metal pan Ceiling Schedule at the end of Part 3.

2.2 ACOUSTICAL METAL PANS, GENERAL

A. Acoustical Metal Pan Standard: Provide metal pans of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

B. Sheet Metal Characteristics: Form metal pans from sheet metals selected for their surface flatness, smoothness, and freedom from surface blemishes where exposed to view in finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discolorations, or other imperfections.

1. Steel Sheet: Commercial-quality, cold-rolled, carbon-steel sheet; stretcher leveled, and as follows:

a. For painted finishes, provide electrolytically zinc-coated steel sheet complying with ASTM A 591/A 591M, Class B coating, chemically treated in mill with phosphate solution and light chromate rinse.

C. Fabrication: Die-form metal pans, from metal indicated, into units of size indicated and configuration standard with manufacturer, with dimples, continuous beads, or spring clips on flanges for snap-in engagement with concealed suspension system, and finished according to requirements indicated in "Finishes, General" Article.

2.3 CURVED METAL CEILING PANELS

A. Manufacturers include the following:

Armstrong Industries Serpentina

Ceilings Plus - Radian

USG - Curvatura

B. Curved Metal Panels, Design Standard - **"RADIANS"** by Ceilings Plus

Sterling Anodized finish with perforated pattern of ¼ inch square holes spaced at ½ inch straight centers

1. Design Standard is used to establish a level of quality for the work and is not to be construed as an elimination of competition or a constraint of trade.

2. Ceiling panels shall be formed in adequate thickness and factory curved to radius shown minimum thickness .040-.062". Segmenting of panels or suspension is not acceptable.

3. Finish to match architect's sample. Finish to be selected from manufacturer's standard color charts unless otherwise specified.

a. The ceiling panels are to be die formed from a single sheet and curved with a minimum 1-1/2" integral return edge on all panel sides. No indentations, marks or defacing of the exposed surface of the metal ceiling panel will be allowed.

b. Perforations - Panels to have a solid margin, non perforated, on all sides.

c. No fasteners of any kind shall be visible on exposed face surfaces of ceiling panels or support tees. Down light openings and sprinkler holes shall be factory precision cut as required.

d. Sound absorbing material to be a black non-woven fabric with Class 1 fire rating. Perforated panels with absorbing material to achieve an N.R.C. of .70- .80 minimum.

2.03 SUPPORTING GRID

A. Supporting grid system shall consist of curving, factory formed tee in adequate thickness, to

support loads. Finish tee to match curving ceiling panels where exposed. Tee shall be factory slotted to accept torsion spring attachment. Framing shall be located to minimize visibility from below. .

Provide systems complete with snap-in runners, splice plates, connector and alignment clips, hangers, trim, seismic- clips and struts, and other suspension components required to support ceiling units and other ceiling-supported construction.

B. Ceiling suspension shall meet structural requirements as required in ASTM 635, ASTM 636,

heavy duty direct hung ceilings

C. Hanger attachments shall be 12 ga. pre-straightened steel wires, rods or other approved hang

ing device that will support required loads.

D.. Tolerances: Maximum deviation of ceiling panels from edge to edge in width shall not exceed

1/8" in 10' when measured with a straightedge placed at any directional location on the finished surfaces. Maximum deviation shall not exceed 1/4" from level in any area or room.

2.3 DECORATIVE TRELLIS STRUCTURE

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.

B. Extruded Bars and Shapes: ASTM B 221 (ASTM B 221M), Alloy 6063-T5/T52.

C. Drawn Seamless Tubing: ASTM B 210 (ASTM B 210M) or ASTM B 483/B 483M, Alloy 6063-T832.

D. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy **6061-T6** unless otherwise recommended by manufacturer

E. Fabricate trellis members to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage**, but not less than that required to support structural loads**.

F. Assemble trellis members in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

G. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

H. Form work true to line and level with accurate angles and surfaces.

I. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

J. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

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 flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

K. Welded Connections for Aluminum : Fabricate tube members to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

L. Provide members with anodized finish, brushed to match Architects Samples.

2.4 CABLE SUPPORTS

A. Manufacturers of Spun cable, Clevis pins and plates

Hayn Inc

Feeney Wire Rope

Ronstan

B. 1/4 inch (6.4 mm) 7 x 7 construction by length as required, 1x19 construction, Type 316 stainless steel cable with a stainless steel threaded terminal factory attached to one end. Provide 2 stainless steel flat washers, 1 stainless steel washer-nut, 2 stainless steel end caps, and 1 stainless steel fitting with each assembly.

C. Accessories: Stainless steel protector sleeves, rubber grommets, beveled washers and additional accessories as recommended by manufacturer for installation conditions.

D. Coating: None.

E. Fittings: Type 316 stainless steel swage style terminals, turnbuckles and fixed ends and other hardware as shown and as recommended by manufacturer for installation conditions.

F. Make up wire-rope assemblies in the shop to field-measured dimensions with fittings machine swaged. Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount is available for tensioning wire ropes. Tag wire-rope assemblies and fittings to identify installation locations and orientations for coordinated installation.

2.5 FINISHES, GENERAL

A. 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.

B. 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 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 and structural framing to which metal pan ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical metal pan ceilings.

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

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of metal pan units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
2. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4."

B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical metal pan.
   1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.
   2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

C. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

D. Install metal pan units in coordination with suspension system and exposed moldings and trim.

   1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated.

3.4 CLEANING

A. Clean exposed surfaces of metal ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION 09513

SECTION 09651 - RESILIENT TILE FLOORING & BASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Vinyl composition floor tile.
2. Resilient wall base and accessories.

B. Related Sections include the following:
1. Division 9 Sections for Carpet

1.3 SUBMITTALS

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

B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors and patterns available for each type of product indicated.

C. Samples for Verification: Full-size tiles of each different color and pattern of resilient floor tile specified, showing the full range of variations expected in these characteristics.

1. For resilient accessories, manufacturer's standard-size samples, but not less than 12 inches (300 mm) long, of each resilient accessory color and pattern specified.

D. Product Certificates: Signed by manufacturers of resilient products certifying that each product furnished complies with requirements.

E. Maintenance Data: For resilient floor tile to include in the maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F (10 and 32 deg C).

C. Store tiles on flat surfaces.

D. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.6 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After postinstallation period, maintain a temperature of not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.

D. Install tiles and accessories after other finishing operations, including painting, have been completed.

E. Where demountable partitions and other items are indicated for installation on top of resilient tile flooring, install tile before these items are installed.

F. Do not install flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish not less than one box for each facility of each type, color, pattern, class, wearing surface, and size of resilient tile flooring installed.

2. Furnish not less than 10 linear feet (3 linear m) for each 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient accessory installed.
3. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Resilient Tile Flooring Schedule at the end of Part 3.

2.2 RESILIENT TILE

A. Vinyl Composition Floor Tile: Products complying with ASTM F 1066 and with requirements specified in the Finish Schedule.

2.3 RESILIENT ACCESSORIES

A. Rubber Wall Base: Products complying with FS SS-W-40, Type I and with requirements specified in the Resilient Tile Flooring Schedule.

B. Rubber Accessory Moldings: Products complying with requirements specified in the Resilient Tile Flooring Schedule.

2.4 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.

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 flooring manufacturer.
2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving resilient flooring.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

A. General: Comply with tile manufacturer's written installation instructions.

B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.

1. Lay tiles square with room axis, unless otherwise indicated.

C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in basket-weave pattern with grain direction alternating in adjacent tiles.

D. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

E. Extend tiles into toe spaces, door reveals, closets, 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 chalk or other nonpermanent, nonstaining marking device.

G. Install tiles on covers for telephone and electrical ducts, and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on covers. Tightly adhere edges to perimeter of floor around covers and to covers.

H. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.

1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Hand roll tiles according to tile manufacturer's written instructions.

3.4 RESILIENT ACCESSORY INSTALLATION

A. General: Install resilient accessories according to manufacturer's written installation instructions.

B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
3. Do not stretch base during installation.
4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
5. Install premolded outside corners before installing straight pieces.
6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

C. Place resilient accessories so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.

D. Apply resilient products to stairs as indicated and according to manufacturer's written installation instructions.

3.5 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing resilient products:

1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum floor thoroughly.
3. Do not wash floor until after time period recommended by flooring manufacturer.
4. Damp-mop floor to remove marks and soil.

B. Protect flooring against mars, marks, indentations, and other 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 flooring manufacturer.

1. Apply protective floor polish to floor surfaces that are free from soil, visible adhesive, and surface blemishes, if recommended in writing by manufacturer.

   a. Use commercially available product acceptable to flooring manufacturer.
   b. Coordinate selection of floor polish with Owner's maintenance service.

2. Cover products installed on floor surfaces with undyed, untreated building paper until inspection for Substantial Completion.
3. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

C. Clean floor surfaces not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

1. Before cleaning, strip protective floor polish that was applied after completing installation only if required to restore polish finish and if recommended by flooring manufacturer.
2. After cleaning, reapply polish to floor surfaces to restore protective floor finish according to flooring manufacturer's written recommendations. Coordinate with Owner's maintenance program.

3.6 RESILIENT TILE FLOORING SCHEDULE

A. Vinyl Composition Tile: Provide vinyl composition floor tile complying with the following:
1. Products: As follows:
2. Color and Pattern: As scheduled on drawings or as selected from Manufacturers full range
3. Class: Class 2 (through-pattern tile)
4. Wearing Surface: Smooth.
5. Thickness: 1/8 inch (3.2 mm).
6. Size: 12 by 12 inches (304.8 by 304.8 mm).

3.7 WALL BASE

A. Rubber Wall Base : Provide rubber wall base complying with the following:

1. Manufacturers: Available Manufacturers include, but are not limited to, the following:

   a. Azrock Industries
   b. Burke Flooring Products
   c. Flexco
   d. Johnsonite
   e. Mannington
   f. Mercer Products Co.
   g. Roppe

7. Color and Pattern: As scheduled on drawings.
8. Style: Cove with top-set toe and straight with no toe at areas as scheduled
9. Minimum Thickness: 1/8 inch (3.2 mm
10. Height: as scheduled on Drawings
11. Lengths: Coils in lengths standard with manufacturer, but not less than 96 feet (29.26 m)
12. Outside Corners: Preformed
13. Inside Corners: Job formed

14. Ends: Premolded.
15. Surface: Smooth.

B. Rubber Accessory Molding: Provide rubber accessory molding complying with the following:

1. Manufacturers: Available Manufacturers include but are not limited to, the following:
   a. RCA Rubber Co
   b. Roppe
2. Color: As selected by Architect from manufacturer's full range of colors produced for rubber accessory molding complying with requirements indicated.
3. Product Description – include the following and as scheduled.
   a. Reducer strip for resilient flooring.
   b. Tile and carpet joiner
   c. Resilient edge for carpet

4. Profile and Dimensions: As indicated or as required for conditions.

END OF SECTION 09651

SECTION 09680 - CARPET

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Broadloom carpet

B. Related Sections include the following:
1. Division 9 Section Resilient Base and Accessories for resilient wall base and accessories installed with carpet.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate required.

B. Shop Drawings: Show the following:

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. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Type, color, and location of insets and borders.
8. Type, color, and location of edge, transition, and other accessory strips.
9. 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- (300-mm-) square Sample.
2. Exposed Edge Stripping and Accessory: 12-inch- (300-mm-) long Samples.
3. Carpet Seam: 6-inch (150-mm) Sample.

D. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.

E. Maintenance Data: For carpet to include in maintenance manuals specified in Division 1. Include the following:

1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

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 and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Carpet Warranty: Written warranty, signed by carpet manufacturer agreeing to replace carpet that does not comply with requirements or that fails within specified warranty period. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

1. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET

A. Available Product: Subject to compliance with requirements, Design Standards that may be incorporated into the Work are limited to products listed in Schedules that are under State contract.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by the 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 that is recommended by the Carpet manufacturer.

C. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.

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 the following:

   a. Carpet manufacturer.

2. Subfloor finishes comply with requirements specified in Division 3 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 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

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 the Carpet manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Direct-Glue-Down Installation: Comply with CRI 104, Section 8, "Direct Glue-Down Installation."

B. Comply with carpet manufacturer's written recommendations 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.
   1. Level adjoining border edges.

C. 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.

D. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

E. 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.

F. Install pattern parallel to walls and borders, unless otherwise indicated on drawings.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet:

B. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
   1. Remove yarns that protrude from carpet surface.
   2. Vacuum carpet using commercial machine with face-beater element.

C. Protect installed carpet to comply with CRI 104, Section 15, "Protection of Indoor Installations."

D. 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.

END OF SECTION 09680

SECTION 09912 - PAINTING

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 surface preparation and field painting of the following:
   1. Exposed interior items and surfaces.
   2. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

   1. Prefinished items include the following factory-finished components:
      a. Finished mechanical and electrical equipment.
      b. Light fixtures.

   2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
      a. Furred areas.
      b. Ceiling plenums.
      c. Pipe spaces.
      d. Duct shafts.

   3. Finished metal surfaces include the following:

      a. Anodized aluminum.
      b. Stainless steel.
      c. Chromium plate.

   4. Operating parts include moving parts of operating equipment and the following:

      a. Valve and damper operators.
      b. Linkages.
      c. Sensing devices.
      d. Motor and fan shafts.

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 6 Section "Interior Architectural Woodwork" for running trim and casework,
1. Division 9 Section "Gypsum Board Assemblies" for surface preparation for gypsum board.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including primers. Use repreentative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.

   a. Submit Samples for Architect's review of color and texture only

C. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project

names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.

1. Quantity: Furnish the Owner with extra paint materials in the quantities indicated below:
   a. Interior, Low-Luster Acrylic Finish: 1 gal of each color applied.
   b. Interior, Semigloss Acrylic Enamel: 1 gal. of each color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work are limited to, products listed in the paint schedules.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Provide color selections made by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

2. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
6. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

F. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

G. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

H. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
2. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:

   a. Quantitative material analysis.
   b. Abrasion resistance.
   c. Apparent reflectivity.
   d. Flexibility.
   e. Washability.
   f. Absorption.
   g. Accelerated weathering.
   h. Dry opacity.
   i. Accelerated yellowness.
   j. Recoating.
   k. Skinning.
   l. Color retention.
   m. Alkali and mildew resistance.

3. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove non-complying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINT SCHEDULE

Coating systems are specified using a design Standard to establish a level of quality required for the finished work. Use of a Design Standard is not to be construed as a restraint of trade or a limit of competition.

A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

1Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a primer.

a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

1. Dulux Paint; 1000-1200 Dulux Ultra Basecoat Interior Latex Wall Primer: Applied at a dry film thickness of not less than 1.2 mils (0.031 mm).

2. Kwal Howells: 0890 Sandable Drywall Primer Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
3. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

b. First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer

1. Dulux Paint; 1402-XXXX Dulux Professional Acrylic Eggshell Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
2. Kwal Paint; 2100 Accu-Pro PC Latex Eggshell: Applied at a dry film thickness of not less than 1.5 mils (0.036 mm).
3. Sherwin-Williams; ProMar 200 Interior Latex Egg-Shell Enamel B20W200 Series: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).

B. Ferrous Metal: Provide the following finish systems over ferrous metal door frames:

Semigloss, Enamel Finish: Two finish coats over a primer.

1. Primer: Quick-drying, rust-inhibitive, alkyd-based primer, as recommended by the manufacturer for this substrate,.

   Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.

   Dulux Paint; 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).

   Kwal Paint; 9210 Accu-Pro Rust Inhibiting Alkyd Metal Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).

   Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

2. Double Finish Coats Alkyd, interior enamel, as recommended by the manufacturer for this substrate,

   Dulux Paint; 1516-XXXX Ultra-Hide Alkyd Semi-Gloss Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).

   Kwal Paint; 4600 Accu-Pro Alkyd Semi-Gloss: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).

   Sherwin-Williams; ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200 Series: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).

C. Projection wall surfacing:

Highly reflective acrylic coating: Screen Goo, Goo Systems

2 basecoats 2 finish coats applied at manufacturers recommended levels but not less than 50 sq. ft per liter

Basecoats - Goo SystemsCRT White Basecoat

Topcoats – Goo Systems CRT White Topcoat

D. Aluminum storefront Framing Re-finishing: where painted storefront is noted for color change – provide the following:

Polyurethane based two part coating - for spray application only – Metallic finish required

Matthews Paints Cool Metallics

S-W – Acrolon Acrylic Polyurethane

Applied at a rate of 4.5 – 9.0 mils as recommended by manufacturer.

END OF SECTION 09912

SECTION 10100 - VISUAL DISPLAY BOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Porcelain enamel markerboards.

B. Related Sections include the following:

   1. Division 6- Section "Rough or Miscellaneous Carpentry" for concealed blocking and nailers.

1.3 SUBMITTALS

A. Product Data: For each type of visual display board indicated. Include motor capacities and individual panel weights for sliding chalkboard and markerboard units.

B. Shop Drawings: For each type of visual display board required.

   1. Include dimensioned elevations. Show location of joints between individual panels where unit dimensions exceed maximum panel length.
   2. Include sections of typical trim members.
   3. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and textures available for the following:

   1. Markerboards: Actual sections of porcelain enamel finish for each type of and markerboard required.

D. Samples for Verification: Of the following products, showing color and texture or finish selected. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected. Prepare Samples from the same material to be used for the Work.

   1. Visual Display Boards: Sample panels not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on the substrate indicated for the final Work. Include a panel for each type, color, and texture required.
   2. Aluminum Trim and Accessories: Samples of each finish type and color, on 6-inch- (150-mm-) long sections of extrusions and not less than 4-inch (100-mm) squares of sheet or plate. Include Sample sets showing the full range of color variations expected.

E. Product Certificates: Signed by manufacturers of tackboards certifying that vinyl-fabric-faced cork tackboard materials furnished comply with requirements specified for flame-spread ratings.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of chalkboard manufacturer for both installation and maintenance of the type of sliding chalkboard units required for this Project.

B. Source Limitations: Obtain visual display boards through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display boards and are based on the products indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify field measurements before preparation of Shop Drawings and before fabrication to ensure proper fitting. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating chalkboards without field measurements. Coordinate wall construction to ensure actual dimensions correspond to established dimensions.

1.6 WARRANTY

A. General Warranty: The special porcelain enamel chalkboard warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Porcelain Enamel Markerboard Warranty: Submit a written warranty executed by manufacturer agreeing to replace porcelain enamel ,markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking, or flaking within the specified warranty period, provided the manufacturer's written instructions for handling, installation, protection, and maintenance have been followed.

1. Warranty Period: 50 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, the following:

1. Porcelain Enamel Markerboards:

   a. Best-Rite Chalkboard Co.
   b. Claridge Products and Equipment, Inc.
   c. Ghent Manufacturing, Inc.
   d. Greensteel, Inc.
   e. ADP Lemco, Inc.
   f. Platinum Visual Systems

B. Porcelain Enamel Markerboards: Balanced, high-pressure-laminated, porcelain enamel boards of 3-ply construction consisting of face sheet, core material, and backing.

1. Face Sheet: 0.024-inch (0.61-mm) enameling grade steel especially processed for temperatures used in coating porcelain on steel. Coat exposed face and edges with a 3-coat process consisting of primer, ground coat, and color cover coat. Coat concealed face with a 2-coat process consisting of primer and ground coat. Fuse cover and ground coats to steel at manufacturer's standard firing temperatures, but not less than 1200 deg F (649 deg C).

   a. Cover Coat: Provide manufacturer's standard gloss-finish cover coat, with color selected from manufacturer's standards for use with liquid chalk or erasable dry markers.

2. Core: 3/8-inch- (9.5-mm-) thick, particleboard core material complying with requirements of ANSI A208.1, Grade 1-M-1.
3. Backing Sheet: 0.018-inch- (0.46-mm-) thick, galvanized steel sheet backing.
4. Laminating Adhesive: Manufacturer's standard, moisture-resistant, thermoplastic-type adhesive.

2.2 ACCESSORIES

A. Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062-inch- (1.57-mm-) thick, extruded-aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units. Keep joints to a minimum. Miter corners to a neat, hairline closure.

1. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.
2. Field-Applied Trim: Manufacturer's standard snap-on trim with no visible screws or exposed joints.
3. Chalktray: Manufacturer's standard, continuous, box-type, aluminum chalktray with slanted front and cast-aluminum end closures for each chalkboard.
4. Map Rail: Furnish map rail at top of each unit, complete with the following accessories:

a. Display Rail: Provide continuous cork display rail approximately 1 or 2 inches (25 or 50 mm) wide, as indicated, integral with map rail.
b. End Stops: Provide one end stop at each end of map rail.
c. Map Hooks: Provide 2 map hooks with flexible metal clips for every 48 inches (1220 mm) of map rail or fraction thereof.

2.3 FABRICATION

A. Porcelain Enamel Markerboards: Laminate facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.

B. Assembly: Provide factory-assembled chalkboard and tackboard units, unless field-assembled units are required.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.
2. Provide manufacturer's standard mullion trim at joints between chalkboards and tackboards.

2.4 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.

1. Surfaces to receive markerboards shall be free of dirt, scaling paint, and projections or depressions that would affect smooth, finished surfaces of chalkboards or markerboards.
2. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

B. Install units in locations and at mounting heights indicated and according to manufacturer's written instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.3 ADJUSTING AND CLEANING

A. Verify that accessories required for each unit have been properly installed and that operating units function properly.

B. Clean units according to manufacturer's written instructions.

END OF SECTION 10100

SECTION 10155 – TOILET COMPARTMENTS

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 toilet compartments and screens as follows:

1. Type: Steel, color-coated finish.
2. Compartment Style: Overhead braced and floor anchored.
3. Screen Style: Wall hung.

B. Related Sections include the following:
1. Division 10 "Toilet and Bath Accessories" for grab bars, and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

D. Samples for Verification: Of each compartment or screen color and finish required, prepared on 6-inch- (150-mm-) square Samples of same thickness and material indicated for Work.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of 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 dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Accurate Partitions Corporation.
2. All American Metal Corp.
3. Ampco Products, Inc.
4. Bobrick Washroom Equipment, Inc.
5. Crane Plumbing; Sanymetal.
6. General Partitions Mfg. Corp.
7. Global Steel Products Corp.

2.2 MATERIALS

A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.

B. Steel Sheets for Color-Coated Finish: Provide mill-phosphatized steel sheet that is leveled to stretcher-leveled flatness complying with the requirements of standards indicated below:

1. Electrolytically Zinc-Coated Steel Sheet: ASTM A 591 (ASTM A 591M), Class C, of the following minimum thicknesses:

   a. Pilasters (Overhead Braced): 0.0359 inch (0.9 mm).
   b. Panels and Screens: 0.0359 inch (0.9 mm).
   c. Doors: 0.0299 inch (0.75 mm).
   d. Tapping Reinforcement: 0.0747 inch (1.9 mm).

C. Core Material for Metal-Faced Units: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) minimum for doors, panels, and screens and 1-1/4 inches (32 mm) minimum for pilasters.

D. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch (0.8 mm) thick and 3 inches (75 mm) high, finished to match hardware.

E. Stirrup Brackets: Manufacturer's standard ear or U-brackets for attaching panels and screens to walls and pilasters of the following material:

1. Material: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear-anodized aluminum.

F. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:

1. Material: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear-anodized aluminum.

G. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile in manufacturer's standard finish.

H. 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. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.

1. Provide internal reinforcement in metal units for compartment-mounted hardware, accessories, and grab bars, as indicated.

B. Metal-Faced Toilet Compartments and Screens: Pressure laminate seamless face sheets to core material and provide continuous, interlocking molding strip or lapped and formed edges. Seal corners by welding or clips. Grind exposed welds smooth.

C. Overhead-Braced-and-Floor-Anchored Compartments: 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.

1. Provide manufacturer's standard 4-inch- (100-mm-) high, overhead cross bracing.

D. Wall-Hung Screens: Provide units in sizes indicated of same construction and finish as compartment panels, unless otherwise indicated.

1. Provide metal-faced screens with integral full-height flanges for attachment to wall.

E. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be handicapped accessible.

1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
2. Latch and Keeper: Recessed 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 handicapped accessible.
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 bumpers at out-swinging doors or entrance screen doors.
5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

2.4 ZINC- OR ZINC-ALLOY-COATED STEEL SHEET FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying finishes.

B. Color-Coated Finish: Provide manufacturer's standard baked finish complying with coating manufacturer's written instructions for pretreatment, application, baking, and minimum dry film thickness.

1. Color: One color in each room as selected by Architect from manufacturer's full range of colors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch (13 mm) between pilasters and panels and not more than 1 inch (25 mm) between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.

1. Secure panels to walls and panels with not less than 2 stirrup brackets attached near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced-and-Floor-Anchored Compartments: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than 2 fasteners. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING AND CLEANING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return to fully closed position.

B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF ,SECTION 10155

SECTION 10520 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Portable fire extinguisher.
2. Fire-protection cabinet for Portable fire extinguisher. Semi-recessed

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection specialties.

1. Fire Extinguishers: Include rating and classification.
2. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of cabinet finish indicated.

C. Samples for Verification: For each type of exposed cabinet finish required, prepared on Samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. Size: 6-by-6-inch- (150-by-150-mm-) square Samples.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Standard for Portable Fire Extinguishers."

C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide extinguishers listed and labeled by FM.

1.5 COORDINATION

A. Coordinate size of cabinets to ensure that type and capacity of fire extinguishers indicated and provided by Owner under separate Contract are accommodated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Portable Fire Extinguishers:

a. Amerex Corporation.
b. J.L. Industries, Inc.
c. Kidde: Walter Kidde, The Fire Extinguisher Co.
d. Larsen's Manufacturing Company.
e. Potter-Roemer; Div. of Smith Industries, Inc.

2. Fire-Protection Cabinets:

a. J.L. Industries, Inc.
b. Larsen's Manufacturing Company.
c. Potter-Roemer; Div. of Smith Industries, Inc.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209 (ASTM B 209M).

2.3 PORTABLE FIRE EXTINGUISHERS

A. General: Provide fire extinguishers of type, size, and capacity for each cabinet and other locations indicated.

B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, in enameled-steel container.

2.4 FIRE-PROTECTION CABINETS

A. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

1. Cabinet Metal: Aluminum sheet.

B. Cabinet Mounting: Suitable for the following mounting conditions as scheduled or shown on drawings

1. Semirecessed: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated.

C. Cabinet Trim Style: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

a. Rolled-Edge Trim: 2-1/2-inch (64-mm) backbend depth.

D. Cabinet Trim Material: Manufacturer's standard, as follows:

1. Aluminum sheet.

E. Door Material: Manufacturer's standard, as follows:

1. Aluminum sheet.

F. Door Glazing: Manufacturer's standard, as follows:

1. Clear float glass, ASTM C 1036, Type I, Class 1, Quality q3, 1.5 mm, single strength.

G. Door Style: Manufacturer's standard design, as follows:

1. Vertical duo panel with frame. Lockable.

H. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.

1. Provide minimum 1/2-inch- (13-mm-) thick door frames, fabricated with tubular stiles and rails, and hollow-metal design.
2. Provide releaseable latch and lock that is resettable after opening.

I. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

2.5 ACCESSORIES

A. Door Locks: Provide cylinder lock, with resettable latch hook all cabinets keyed alike.

B. Identification: Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location. Locate as indicated by Architect.

1. Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER" applied to door.
   a. Application Process: Vinyl letters.

b. Lettering Color: Red.
c. Orientation: Vertical.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical 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.

D. Cabinet and Door Finishes: Provide manufacturer's standard baked-enamel paint for Interior of cabinets and doors.

2.7 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets are to be installed.

C. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged units.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing fire-protection specialties.

B. Install in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. Prepare recesses for cabinets as required by type and size of cabinet and trim style.
2. Fasten cabinets to structure, square and plumb.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust cabinet doors that do not swing or operate freely.

B. Refinish or replace cabinets and doors damaged during installation.

C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10520

SECTION 10801 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Toilet and bath accessories.

2. Soap Dispensers, Paper towel and toilet paper dispensers are vendor provided and installed.

B. Related Sections include the following:

1. Division 6 Section “Miscellaneous Carpentry” for concealed blocking supporting wall hung accessories
2. Division 10 Section "Toilet Compartments" for compartments and screens.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

B. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.4 QUALITY ASSURANCE

A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.

1. Products of other manufacturers listed in Part 2 with equal characteristics, as judged solely by Architect, may be provided.
2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, 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.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Toilet and Bath Accessories:

a. A & J Washroom Accessories, Inc.
b. American Specialties, Inc.
c. Bobrick Washroom Equipment, Inc.
d. Bradley Corporation.
e. General Accessory Manufacturing Co. (GAMCO).
f. McKinney/Parker Washroom Accessories Corp.

B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule at the end of Part 3.

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.

C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.

F. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

G. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

H. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

I. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

C. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.

   1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

D. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
   1. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

E. 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. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

C. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. 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 TOILET AND BATH ACCESSORY SCHEDULE

Design Standards are used to establish a level of quality required for the work. The use of a Design Standard is not to be construed as a limit of competition or a restraint of trade.

A. Grab Bar provide stainless-steel grab bar complying with the following:

1. Products: Bobrick straight wall Bobrick B-6806 36" & 42"

2. Corner wall Bobrick B-6861
3. Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
4. Mounting: Concealed with manufacturer's standard flanges and anchors
5. Gripping Surfaces: Manufacturer's standard slip-resistant texture
6. Outside Diameter: 1-1/2 inches (38 mm) for heavy-duty applications.

B. Sanitary Napkin Disposal Unit: provide stainless-steel sanitary napkin disposal unit complying with the following:

1. Products: Bobrick B-254
2. Surface-Mounted Type: With seamless exposed walls; self-closing top cover; locking bottom panel with stainless-steel, continuous hinge; and removable, reusable receptacle.

C. Mirror Unit: provide mirror unit complying with the following:

1. Products: Bobrick B-165 - sizes as indicated
2. Stainless-Steel, Channel-Framed Mirror: Fabricate frame from stainless-steel channels in manufacturer's standard satin or bright finish with square corners mitered to hairline joints and mechanically interlocked.

D. Typical at all Janitor's closets with sinks : complying with the following:

1. Products: Bobrick B- 239 34" long
2. Mop and Broom Holder: 36-inch- (914-mm-) long unit fabricated of minimum nominal 0.0375-inch- (0.95-mm-) thick, stainless-steel hat channel with four spring-loaded, rubber, cam-type, mop/broom holders.
3. Hook Strips: B232 x 36 with 4 strips

END OF SECTION 10801

SECTION 12491 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following types of venetian blinds and accessories:

1. Standard Miniblinds with Aluminum louver slats.

1.3 DEFINITIONS

A. Miniblind: Venetian blind with nominal 1-inch- (25-mm-) wide or wider louver slat.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.

B. Shop Drawings: Show location and extent of horizontal louver blinds. Show installation details, mountings, attachments to other Work, operational clearances, and relationship to adjoining work.

C. Samples for Initial Selection: For each colored component of each type of horizontal louver blind indicated.

1. Include similar Samples of accessories involving color selection.

D. Window Treatment Schedule: Include horizontal louver blinds in schedule using same room designations indicated on Drawings.

E. Maintenance Data: For horizontal louver blinds to include in maintenance manuals. Include the following:

1. Methods for maintaining horizontal louver blinds and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to finishes and performance.
3. Operating hardware.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain horizontal louver blinds through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide horizontal louver blinds 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:

1. Flame-Resistance Ratings: Passes NFPA 701.

C. Corded Window Covering Product Standard: Provide horizontal louver blinds complying with WCMA A 100.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver blinds in factory packages, marked with manufacturer and product name, **fire-test-response characteristics,** and location of installation using same room designations indicated on Drawings and in a window treatment schedule.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds 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 operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the 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, the following:

1. Standard, Horizontal Louver Blinds, Aluminum Louver Slats:
   a. Hunter Douglas Window Fashions: Celebrity
   b. Levolor Contract;Levolor: Riviera
   c. Bali, Graber Classic

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM LOUVER SLATS

A. Louver Slats: Aluminum, alloy and temper recommended by producer for type of use and finish indicated; with crowned profile **and radiused corners**.

1. Nominal Slat Width: 1 inch (25 mm) for miniblinds.

   a. Slat Spacing: Every 18 mm for 16.7 slats or more per foot (18 mm).
2. Nominal Slat Thickness: Not less than 0.006 inch (0.15 mm).
3. Slat Finish: One color as selected by Architect.

B. Valance: **Manufacturer's standard**.

1. Finish Color Characteristics: **Match color, texture, pattern, and gloss of louver slats**

C. Mounting: **Wall** mounting permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated. Brackets shall not be attached to window framing.

1. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind.

D. Colors, Textures, Patterns, and Gloss: **As selected by Architect from manufacturer's full range**.

2.3 HORIZONTAL LOUVER BLINDS FABRICATION

A. Product Standard and Description: Comply with AWCMA Document 1029, unless otherwise indicated, for each horizontal louver blind designed to be self-leveling and consisting of louver slats, rails, ladders, tapes, lifting and tilting mechanisms, cord, cord lock, tilt control, and installation hardware. Provide unit with manufacturers contoured headrail.

B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lifting and Tilting Mechanisms: With permanently lubricated moving parts.

C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
1. Blind Units Installed Outside Jambs: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

D. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail, valance, and operating hardware, and for hardware position and blind mounting method indicated.

E. Installation Fasteners: Not fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Component Color: Provide rails, cords, ladders, and exposed-to-view metal and plastic matching or coordinating with slat color, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 HORIZONTAL LOUVER BLIND INSTALLATION

A. Install blinds level and plumb and aligned with adjacent units according to manufacturer's written instructions, and located so exterior louver edges in any position are not closer than **1 inch (25 mm)** to interior face of glass. Install intermediate support as required to prevent deflection in headrail. Allow clearances between adjacent blinds and for operating glazed opening's operation hardware, if any.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean blind 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 horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged blinds that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 12491

SECTION 15010 GENERAL PROVISIONS

PART 1 - GENERAL

GENERAL CONDITIONS:

The contractor shall carefully read the General Conditions of the Contract and all information to bidders which, with the following specifications for heating, cooling, plumbing, exhaust, ventilation, fire protection, and temperature control are a part of the Contract.

BASIC BID:

Shall include all labor and materials specified in this division. The term "furnish" and/or "install" or similar implication shall mean "furnish and install complete."

SCOPE OF WORK:

The work to be done under this section includes the furnishing of all labor, materials, equipment, controls and accessories required to complete all heating, air conditioning, ventilating, plumbing, drainage, and other mechanical systems as shown on plans and/or described in these specifications, or as required to provide a complete and functional facility.

Work shall include, but shall not be necessarily limited to, the following:

1. System commissioning
2. Testing
3. Balancing
4. Insulation systems
5. Air distribution system
6. Exhaust systems
7. Fire protection
8. Utilities
9. Control systems
10. Air conditioning system
11. Plumbing systems
12. Special systems

This contractor shall provide all miscellaneous electrical work and control wiring for special systems where the wiring requirements are provided by the equipment manufacturers and/or suppliers.

CODES AND ORDINANCES:

The work shall be installed in accordance with the state and local plumbing codes, and any other government code or ordinance that governs the type of work covered by these specifications. Should any

drawings conflict with the city, county, or state code, the code shall govern the proper installation of the work, and no extra charge shall be made for such change.

Should the contractor perform any work that does not comply with the requirements of the applicable building codes, state laws, local ordinances, industry standards, or utility company regulations, he shall bear all costs arising in correcting the deficiencies.

Where the work required by the drawings and specifications exceeds local requirements, it shall be done as shown or specified.

DRAWINGS AND SPECIFICATIONS:

These specifications are intended to cover all labor, material, and standards of mechanical workmanship to be employed in the work shown on the drawings and called for in these specifications or reasonably implied by terms of same. The drawings and specifications are intended to supplement one another, and any part of the work that may be mentioned in the one and not represented in the other shall be done the same as if it had been mentioned or represented in both. Large scale drawings shall take precedence over layouts and small scale details.

INTERPRETATION OF DRAWINGS AND DOCUMENTS:

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications, or other proposed contract documents, or finds discrepancies in or omissions from the drawings or specifications, he may submit to the Owner's representative a written request for an interpretation or correction thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the proposed documents will be made only by addenda duly issued, and a copy of such addenda will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanations or interpretations of the proposed documents.

The Owner's representative will interpret the meaning of any part of the drawings and specifications about which any misunderstanding may arise, and his decisions will be final. Should there appear to be any error or discrepancy in or between the drawings and specifications, the contractor shall refer the matter to the Owner's representative for adjustment before proceeding with the work. Should the contractor proceed with the work without so referring the matter, he does so on his own responsibility.

WORKMANSHIP:

Workmanship shall be the best quality of its kind for the respective industries, trades, crafts, and practices, and shall be acceptable in every respect to the Owner's representative.

SUBSTITUTIONS:

See Special Conditions pertaining to Substitutions.

FEES AND PERMITS:

This contractor shall obtain all necessary permits and pay all fees required in connection with the work.

Rules of local utility companies shall apply at time of bidding. Contractor shall have checked with each utility company supplying services to this installation, and shall determine from them all valves, boxes, meter boxes, and meters which they will require to be installed, and shall figure cost of same in his bid. No extra payment will be made for installation of such items.

SITE INSPECTION AND EXAMINATION OF DRAWINGS:

The contractor shall carefully study all drawings and specifications pertaining to the work. If any of the work as laid out, indicated, or specified is contrary to or conflicts with any governing ordinances or regulations, the same shall be reported to the Owner's representative before submitting a bid. The Owner's representative will then issue instructions as to procedure.

The contractor shall carefully examine the building site and compare the drawings with existing conditions. By the act of submitting a bid, the contractor shall be deemed to have made examination, have accepted such conditions, and to have made allowance therefore in preparing his bid.

VERIFICATION OF DIMENSIONS:

Before proceeding with any work, the contractor shall carefully check and verify all dimensions, sizes, etc., and shall assume full responsibility for the fitting-in of his ductwork, piping, and equipment. Where apparatus and equipment has been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The contractor shall carefully check the drawings to see that the equipment he is required to install will fit into the spaces provided, and will allow for proper maintenance and service of the equipment.

Where the need for coordination drawings are deemed appropriate by the owner's representative, the contractor shall take necessary field measurements and prepare the drawings as directed at no additional cost to the owner.

RECORD DRAWINGS:

The contractor shall provide and keep up to date a complete record set of ozalid prints which shall be corrected daily to show change from the original drawings and specifications, the size and kind of equipment, location and inverts of all buried or concealed pipes and ducts, etc. Prints for this purpose will be furnished by the Owner's Representative. This set of drawings shall be kept on the work site and shall be used only as record set. Upon completion of the work, the set of record drawings shall be turned over to the Owner's Representative.

COOPERATION WITH OTHERS:

The contractor shall so organize the work that progress will harmonize with the work of all trades, so that all work may proceed as expeditiously as possible. The contractor shall be held responsible for any delays which result from his negligence or failure to coordinate or cooperate with other contractors or crafts.

LOCATION OF PIPING AND EQUIPMENT:

The locations of all piping, ducts, apparatus, and equipment indicated on the drawings are approximate only, and shall be changed, as necessary and as approved by the Owner's Representative, to meet the actual structural and architectural conditions at the job site. Any change in work which has not been installed shall be made by the contractor without additional compensation, except changes which are caused by architectural and structural changes which increase the size of mains, the number of fixtures or the length of runs. All changes shall be made only upon approval of a written change order.

GUARANTEE:

By the acceptance of the contract award for the work herein described, the contractor assumes the full responsibility imposed by the guarantee as set forth herein and should protect himself through proper guarantee from equipment and specialty manufacturers and subcontractors as their interests may appear.

All materials and equipment provided and installed under this division of the specifications shall be guaranteed for a period of one (1) year from the date of substantial completion and acceptance by the Owner, unless specifically noted elsewhere on the plans or in the specification. Should any trouble develop during this period due to defective materials or workmanship, the contractor shall correct the trouble without cost to the Owner, any defect noticed at the time of installation and/or during the guarantee period shall be immediately corrected to the entire satisfaction of the Owner and the Owner's Representative.

SHOP DRAWINGS & SAMPLES:

After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the contractor shall submit to the owner's representative for review in accordance with the accepted schedule of Shop Drawing submissions, or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Conditions) of all Shop Drawings, which will bear a stamp or specific written indication the contractor has satisfied the contractor's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as owner's representative may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable Owner's representative to review the information as required.

The contractor shall also submit to the Owner's representative for review with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that the contractor has satisfied the

contractor's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.

Before submission of each Shop Drawing or sample the contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each shop drawing or sample with other Shop Drawings and samples and with the requirements of the work and the Contract Documents.

At the time of each submission, the contractor shall give the Owner's representative specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to the Owner's representative for review and approval of each such variation.

The Owner's representative shall review with reasonable promptness Shop Drawings and samples, but the Owner's representative's review will be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. The contractor shall make corrections required by the Owner's representative, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. The contractor shall direct specific attention in writing to revisions other than the corrections called for by the Owner's representative on previous submittals.

The Owner's representative's review of Shop Drawings or samples shall not relieve the contractor from responsibility for any variation from the requirements of the Contract Documents unless the contractor has in writing called the Owner's representative's attention to each such variation at the time of submission and the Owner's representative has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by the Owner's representative relieve the contractor from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of these specifications.

Where a Shop Drawing or sample is required by the Specifications, any related work performed prior to the Owner's representative's review and approval of the pertinent submission will be the sole expense and responsibility of the contractor.

Shop drawings shall be neatly bound in hard-backed looseleaf binders, completely indexed.

1. Fan coil units
2. Valves
3. Circulating pumps

4. VAV boxes
5. Piping systems
6. Pipe and duct supports & restraints
7. Plumbing fixtures
8. Exhaust air fans
9. Dampers
10. Grilles & registers
11. Diffusers
12. Insulation systems
13. Vibration isolators
14. Automatic temperature controls
15. Air balance contractor qualifications
16. Other schedule items as required.

Owner's Refusal Right:

In the event that items submitted are substitutions for specified items and are found to be not acceptable, the right shall be reserved to require the specified items.

OPERATING INSTRUCTIONS AND CATALOG INFORMATION:

This contractor shall compile in looseleaf binders catalogs of every product used by him in the completion of the work. The binders shall also include copies of the test data (Section 15042), balancing reports (Section 15043), and system commissioning data (Section 15030). Before final acceptance by the Owner's Representative, he shall turn over to the Owner this compilation of catalog data. A double index shall be provided, one giving an alphabetical list of products for which catalogs are included, and one giving their addresses, whose products are included in the work. Four (4) copies shall be delivered to the Owner's representative for his approval.

Binders shall be white vinyl with see-thru front and end of panels identified as follows:

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2005
OPERATING & MAINTENANCE MANUAL
SET #

PART 2 - PRODUCTS

MATERIALS, EQUIPMENT AND ACCESSORIES:

Unless otherwise specified, all equipment, accessories, and materials shall be new and undamaged, and the workmanship shall be of the best quality for the use intended, and shall be acceptable to the Owner's Representative.

Equipment, accessories, and materials shall be essentially the standard products of the manufacturer, or as specified herein. Where two or more units of the same class of new equipment are required, these units shall be products of a single manufacturer. Should mechanical equipment other than that used in the design be furnished, it shall be the responsibility of the mechanical subcontractor to provide large scale installation drawings, as required, showing service and maintenance points. The layouts shall provide proper clearance for service.

All equipment shall be selected to deliver full rated capacity at the job site elevation.

PART 3 - EXECUTION

FUNCTIONING AND OPERATION OF EQUIPMENT:

Contractor's Responsibility:

Installation and startup shall be so made that its several component parts will function together as a workable system, and shall be left with all equipment properly adjusted and in working order. The contractor shall explain to the Owner the operation of the mechanical systems and fully instruct him regarding its proper operation, servicing, and maintenance.

CLEANING AND PATCHING BY MECHANICAL CONTRACTOR:

The contractor shall remove all stains or grease marks on walls, floors, glass, hardware, fixtures, or elsewhere caused by his workmen, or for which he is responsible. He shall remove all stickers on plumbing fixtures, do all required patching up and repair all work of others damaged by this division of the work, and leave the premises in a clean and orderly condition.

PROTECTION AGAINST THE ELEMENTS:

The contractor shall, at all times, take adequate precautions to protect his work and all stored materials and equipment from damage by the elements, and shall not expose the work of any other contractor to such damage.

REMOVAL OF DEBRIS, ETC.:

Upon completion of this division of the work, remove all surplus material and debris resulting from his work, and leave the premises in a clean and orderly condition.

OPENINGS FOR MECHANICAL SYSTEMS:

All openings required for installation of mechanical systems shall be provided by the mechanical contractor.

SAFETY REGULATION:

The contractor shall comply with all local and OSHA safety requirements in performance with this work. (See General Conditions). This contractor shall be required to provide equipment, supervision, construction, procedures, and all other necessary items to assure safety to life and property.

OWNER FURNISHED EQUIPMENT:

This contractor shall include in his bid the necessary labor and material to install the required services to equipment furnished by the Owner. This contractor shall relocate (where noted), rough-in and make final connections to owner furnished equipment.

ASBESTOS & HAZARDOUS WASTES:

Unless specifically included elsewhere in these contract documents, the removal of asbestos fiber bearing material or materials containing hazardous wastes are not a part of this contract. Should such material be identified on the contract site, the owner's representative shall be so notified.

SECTION 15030 SYSTEM COMMISSIONING

PART 1 - GENERAL

DESCRIPTION:

The work required under this section shall be done by the same firm which is providing system balancing services under section 15043. The work shall include, but not necessarily be limited to, the following:

The pre-startup inspection of all systems and subsequent correction of any incorrect items.

The initial first run inspections.

System operations inspection.

The written certification required by the last paragraph of this section shall be completed prior to substantial completion. The owner's representative shall approve the system commissioning form before the commissioning process begins.

The intent of this section is to provide for proper installation, startup, service, and operation of the mechanical systems in preparation for system balancing. See Section 15043 for balancing. After completion of the balancing, the mechanical system shall be ready for Owner occupancy, with all systems operating as intended.

Repair, replacement, or adjustment of each item shall be performed for startup.

All pertinent items shall be checked, including, but not necessarily limited to, the following:

1. Removal of shipping stops.
2. Vibration isolators properly aligned and adjusted.
3. Flexible connections are properly aligned.
4. Belts are properly adjusted.
5. Belt guards and safety shields are in place.
6. All systems are properly filled.
7. Filters are in place with a proper seal around their edges.
8. Fire dampers are properly installed, linked, and serviceable.
9. Pressure and temperature gauges of the proper size and range are installed.
10. All test stations and measuring devices are installed and functioning.
11. Initial lubrication of equipment is complete.
12. Filters and strainers are clean.
13. Motor rotations are correct.
14. Voltages match nameplates.
15. Control system is operating properly.
16. All interlocks are wired and verified.
17. All controls have been connected and verified.

18. All valves, dampers, and operators are properly installed and operating.
19. All ductwork is installed and connected.
20. Pump start-up screens are removed and operational screens installed.
21. All water piping is located in spaces which are heated to prevent freezing.
22. All other items necessary to provide for proper start-up.
23. All equipment installed properly.

FIRST RUN INSPECTION:

Recheck all items outlined in pre-startup inspection to insure proper operation.

Check the following items:

1. Excessive vibration or noise.
2. Loose components.
3. Initial control settings.
4. Motor amperages.
5. Heat buildup in motors, bearings, etc.
6. Control system is properly calibrated and functioning as required. Correct all items which are not operating properly.

SYSTEM OPERATION INSPECTION:

The mechanical systems shall be observed under operation conditions for sufficient time to insure proper operation under varying conditions, such as daylight and heating-cooling.

Periodically check the following items:

1. Strainers and filters.
2. Visual check of air flow for "best guess" setting for preparation for system air balancing under Section 15043.
3. Control operation of time clocks, on-off sequences, system cycling, etc.
4. Visual checks for water flow, seals, packings, safety valves, operating pressures and temperatures.
5. Cleaning of excessive oil or grease.
6. Dampers close tightly.
7. Valves close tightly.
8. System leaks.
9. All other items pertaining to the proper operation of the mechanical system, whether specifically listed or not.

WARRANTY SCHEDULE:

Provide a list in each O & M manual for all motors, fans, and equipment with serial numbers and date of startup approved by the Owner's Representative, date of warranty, extend of warranty, and equipment supplier with address and phone numbers.

SCHEDULE OF OVERLOAD PROTECTION:

Provide a list in each O & M Manual of all motors with size, voltage, amperage, and size and rating of overload protection.

CERTIFICATION:

Provide written certification of all tests, and start-up procedures as directed by the owner's representative and bind a copy of this certification in the O & M manuals. Certification shall include an itemized list of systems serviced during the system commissioning process for each piece of equipment with dates, times, and a complete description of the work completed. All reports shall bear the typed name and signature of the system commissioning mechanic.

SECTION 15042 - TESTING

PART 1 - GENERAL

DESCRIPTION:

The work outlined in this section shall be performed by the several trades involved.

The mechanical contractor shall provide all supervision, labor, materials, tools, scaffolding, and equipment required to complete all system testing.

The mechanical contractor shall remove and repair any defective component, as indicated by the system tests and retest.

The contractor shall test the operation of all safety and high limit controls to insure proper installation and operation. Any defective devices shall be replaced.

TESTS AND ADJUSTMENTS:

Before any piping is covered, tests shall be made in the presence of the Owner's representative and any leaks or defective work corrected.

Before application of insulation covering, and as far as practical before concealing any piping, all piping shall be hydrostatically tested and proved tight. Stubs shall be capped and all control valves shall be removed during the test. System may be tested in sections, providing connections to last section tested are included in each succeeding test. Following minimum pressures shall be used for testing:

1. Domestic hot and cold water piping at 150 psig for six hours.
2. Plumbing waste and vent piping at 50 ft. head for six hours.
3. Low pressure air ducts in accordance with IMC and SMACNA standards.
4. Medium pressure air ducts in accordance with SMACNA standards.
5. Rainwater piping at 10 ft. head for six hours.
6. Heating water and chilled water system piping at 150 psig for six hours.

All valves and equipment which may be damaged shall not be subjected to the test pressure.

PART 2 - PRODUCTS

EQUIPMENT:

The contractor shall furnish all necessary gauges, plugs, test fans, pumps, etc., as required, to conduct the tests.

REPORTS:

The contractor shall give the Owner's representative one week notice prior to performing the tests. All tests shall be recorded and copies of reports bound in the O & M manuals and given to the Owner.

PART 3 - EXECUTION

PROCEDURE:

The contractor shall be responsible to conduct all tests in a safe manner, protecting the work of other trades from water or physical damage.

The tests, as indicated, shall be in addition to any test, as required, by any governing agencies. Submit all approved test procedures and results, as required by governing agencies to the Owner's Representative.

All tests, necessary repairs, and retest, shall be performed by the contractor which installed the system.

Upon completion, a test shall demonstrate that all traps are properly vented, that there is an ample supply of hot and cold water to fixtures, that no fixture or equipment can be back-siphoned, and that there are no backflow connections.

SECTION 15043 - BALANCING

PART 1 - GENERAL

SCOPE OF WORK:

The mechanical contractor shall employ an independent technical firm to perform the checking, adjusting, and balancing (CAB) of the air conditioning systems. See Section 15030 for related work by the CAB contractor. This firm shall be one whose operations are limited to the field of professional CAB, and this firm shall meet the following qualifications:

1. The firm shall be a member of NEBB and/or AABC.

2. The firm shall be one which is organized to provide professional services of this specific type.

3. The firm shall be capable of performing the services within the time frame specified, and following up the basic work as may be required.

4. All personnel used on the job site shall be engineering technicians, who shall have been permanent, full-time employees of the firm for a minimum of six (6) months prior to the start of the work for this project.

As a part of this contract, the mechanical contractor shall make all changes in the sheaves, belts, and dampers, including the addition of dampers required for correct balance, as required by the CAB firm, at no additional cost to the Owner.

The mechanical contractor shall provide and coordinate services of qualified, responsible subcontractors, suppliers, and personnel, as required to correct, repair, or replace any and all deficient items or conditions found during the testing, adjusting, and balancing period.

In order that all systems may be properly checked, balanced, and adjusted, as required herein by these specifications, the mechanical contractor shall, after the systems have been properly commissioned, operate said systems at his expense for the length of the time necessary to properly verify their completion and readiness for the CAB and shall further pay all costs of operation during the CAB period.

Do not begin balancing until the commissioning requirements of section 15030 are completed.

Project contract completion schedules shall provide sufficient times to permit the completion of CAB services prior to Owner occupancy.

DOCUMENTS:

The Owner's Representative will furnish, without charge to the CAB firm, one set of mechanical specifications, all pertinent change orders, and the following:

1. One complete set of plans less the structural sheets.
2. One set of mechanical floor plans of the conditioned spaces.

These sheets should be ozalid type (blue or black on light background) reproductions to facilitate marking.

Approved submittal data on equipment installed to accomplish the test procedures outlined in paragraph "Services to the CAB Firm" of this specification will be provided by the mechanical contractor.

The Owner's representative shall transmit one copy of the following "Records for Owner" to the CAB firm for review and comments:

1. Record drawings
2. Approved fixture brochures, wiring diagrams, and control diagrams
3. Shop drawings
4. Instructions
5. Motor and valve charts
6. Operating and maintenance manuals

MATERIALS AND WORKMANSHIP:

The scope of the CAB work, as defined herein, is indicated in order that this project's mechanical contractors will be appraised of the coordination, adjustment, and system modification which will be required under the project in order to complete the Owner's requirements for final CAB. The CAB firm will have a contractual relationship with this mechanical contractor, but will be responsible directly to the Owner for the satisfactory execution of the CAB work.

SERVICES OF MECHANICAL CONTRACTOR:

The mechanical contractor shall have all systems complete, calibrated, commissioned, and in operational readiness prior to notifying the CAB firm that the project is ready for their services, and the contractor shall so certify in writing to the Owner that such a condition exists.

Should the CAB firm be so notified and the CAB work commenced and the systems are found to not be in readiness or a dispute occurs as to the readiness of the systems, the mechanical contractor shall request an inspection be made by a duly appointed representative of the Owner, CAB firm, and the mechanical contractor. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for CAB services. Should the inspection reveal the CAB services notification to have been premature, all costs of the inspection and work previously accomplished by the CAB firm shall be paid for by the project mechanical contractor.

SERVICES OF THE CAB FIRM:

The technical CAB firm shall submit biographical data on the individual proposed to directly supervise the CAB work. It shall also submit their record of specialized experience in the field of air and hydronic system balancing, proper use of calibrated instrumentation and the manner of test reports. The supervisory

personnel for the CAB firm shall be registered engineers in the mechanical field and all of the employees used in the CAB firm shall be permanent, full-time employees of the firm.

Act as liaison between the Owner, Owner's Representative, and contractor and inspect the installation of mechanical piping systems, sheet metal work, temperature controls and other component parts of the heating, air conditioning, and ventilating systems. The inspection of the work will cover that part relating to proper arrangement and adequate provisions for the checking and balancing.
Upon completion of the installation and start-up of the mechanical equipment, to check, adjust, and balance system components to obtain optimum conditions on each conditioned space in the building.

Prepare and submit to the Owner (or his delegated representative) complete reports on the balance and operations of the systems.

Make a total of three inspections within ninety (90) days after occupancy of the building, with the owner's representative present, to insure that satisfactory conditions are being maintained throughout and to satisfy any unusual conditions.

Make an inspection in the building during the opposite season from that in which the initial adjustments were made at that time, make any necessary modifications to the initial adjustment required to product optimum operation of the system components, to produce the proper conditions in each conditioned space.

The CAB firm shall be responsible for inspecting, adjusting, balancing, and logging the data on the performance of the following general systems, including all components:

1. Fan coil units including HW, CW coils, fans, controls, etc.
2. Air distribution systems including ductwork, dampers, diffusers, registers, grilles, exhaust fans, etc.
3. Temperature control system in its entirety, including the verification of all control sequences and verify devices.

Before any adjustments are made, the air systems are to be checked for such items as dirty filters, duct leakage, damper leakage, equipment vibrations, correct damper operations, etc.

It shall be the responsibility of the CAB personnel to check, adjust, and balance the components of the various systems as listed above using an applicable "proportionate balance procedure" in order that each of them will operate under optimum noise, temperature and air flow conditions in the conditioned spaces in the building "while simultaneously operating at the most energy efficient condition."

During the balancing process, if abnormalities or malfunctions of equipment or components are discovered by the CAB personnel, the construction inspector shall be advised promptly so that the condition may be corrected by the project contractor. Data from malfunctioning equipment or components shall not be recorded in the final CAB report.

PART 2 - PRODUCTS

EQUIPMENT AND INSTRUMENTS:

This contractor shall provide all necessary labor, equipment, scaffolding, instruments, and materials required to adjust, balance, and check all systems.

PART 3 - EXECUTION

REPORT:

The activities, as described hereinbefore, will culminate in a report to be provided to the Owner or his delegated representative. This report shall be furnished in six (6) copies. One copy shall be bound in each O & M manual. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operating personnel.

All measurements and recorded readings (of air, electricity, etc.) that appear in the reports must be done on-site by the permanently employed technicians of the firm.

At the option of the Owner's Representative, all data sheets tabulated each day by CAB personnel may be initialed by the Owner's Representative. Those work sheets so initialed, or copies thereof, shall be included in the final CAB report.

The CAB report shall include the following as a minimum:

Preface:

A general discussion of the system, any idiosyncrasies, any problems encountered, an outline of normal and ventilation cycles of operation, any noise problem not corrected.

Pitot Tube Traverses:

For use in future trouble-shooting by maintenance personnel, all exhaust ducts, main supply ducts, and return ducts will have air velocity and volume measured and recorded by the traverse method. Locations of these traverse test stations will be described on the sheet containing the data.

Temperature Tabulation:

Of all conditioned spaces on a room-by-room basis, a total of at least three readings will be taken of each room on successive days. Record outside ambient temperature at two-hour intervals. The total variation in conditioned space temperatures shall not exceed 2 deg. variance from the thermostat settings.

Air Volumes and Velocities:

As measured at each supply grille, return air grille, and exhaust air grille or air handling device. In all fan systems, the air quantities indicated on the plans may be varied, as required, to secure a maximum temperature variation of two degrees within each separately controlled space, but the total air quantity indicated for each zone must be obtained. It shall be the obligation of the contractor to furnish or revise fan drive and/or motors, if necessary, without cost to the Owner, to attain the specified air volumes.

Air Pressure:

As measured across each fan coil unit, coil, filter and exhaust fan. Relate these readings to the particular fan curve in terms of CFM handled.

Electrical Current/Voltage:

Measurements to be taken at the drive motor on each piece of equipment.

Fan Speeds:

To be measured in RPM.

Instrumentation List:

A list of instruments by type and make used in gathering the CAB data.

Drawings:

The CAB contractor's working drawings shall have the supply air openings numbered and/or lettered to correspond to the numbers and letters used on the report data sheets so that data in the report can be correlated with each specific supply air opening in the building. If room numbers actually used in the building differ from those on the plans, the building room numbers shall be marked on these plans. Only one such marked-up set of drawings need be provided with the two copies of the CAB report.

Before final acceptance of the CAB report, the report data, at the discretion of the Owner, shall be verified one time on the job site, by selection of check points (not to exceed 10 percent of total) at random, in the presence of the Owner's Representatives. Representatives of the testing firm doing the work shall be present and provide the necessary equipment for test data verification. The Owner shall provide written data notice of acceptance of the report and, after clarification of any question by Owner, shall be considered final.

The firm shall be responsible for inspecting, adjusting, balancing, and logging the data on the performance of fans, all dampers in the duct system, all air distribution devices, the flows of freon thru all coils, and the power consumption of all motors. The contractor, mechanical contractor, the various subcontractors involved, and the suppliers of the equipment installed shall all cooperate with the balancing

agency to provide all necessary data on the design and proper application of the systemic components and shall furnish all labor and material required to eliminate any deficiency or malperformance.

During the CAB work, the temperature regulation will be adjusted for proper relationship between controlling instruments. The Owner's representative will be advised of any instruments out of calibration so that the controls subcontractor may come in and recalibrate, using data supplied by the balancing firm. After recalibration, the correctness of the final setting shall be proved by taking four temperature readings at two hourly intervals in a typical room on each zone affected by the recalibration. The total variation shall not exceed two degrees from the present median temperature during the entire temperature survey period. The detailed test data recorded hereunder shall be included in the CAB report.

Make a total of three inspections within ninety (90) days after occupancy of the building accompanied by the owner's representative to insure that satisfactory conditions are being maintained throughout and to satisfy any unusual conditions. An additional inspection in the building shall be made by the firm during the season opposite that in which the initial adjustments were made. At that time, any necessary modifications to the initial adjustment required to produce optimum operation of the system components shall be made to produce the proper seasonal conditions in each conditioned space. At the time of opposite season checkout, the Owner's Representative shall be given timely notification before any readings or adjustments are made so that he may participate in the checkout.

SECTION 15050 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

DESCRIPTION:

This section specifies the basic materials and methods to be used in Division 15.

All materials shall be new and undamaged. Protect all materials to keep free from foreign materials.

CUTTING AND PATCHING:

Any cutting, patching, or filling necessary for the proper execution of this work, except as noted on drawings, shall be done by this contractor. Where any other part of the building is involved, it shall be done by a competent workman in a neat and workmanlike manner. No rough or unsightly work will be allowed. Cutting of structural members shall be done only with the approval of the Owner's Representative.

The attention of the contractor is directed to the requirements of running pipes and ducts thru concrete slabs, walls, and beams. These conditions are to be anticipated and sleeves installed, as provided for under "Sleeves." Sleeves shall be placed in structural members only where approved by the Owner's Representative.

INSERTS:

Furnish and set, in all necessary locations, before or during construction, unistrut inserts for use in connection with the support or placing of piping, ductwork, and equipment furnished under this division of the work.

SLEEVES AND BOXES:

Sleeves for Concrete or Masonry Surfaces:

For pipes passing thru masonry or concrete construction, provide sleeves at least two pipe sizes larger than the pipe passing thru and made from sections of steel pipe. Provide galvanized iron sleeves with collar on each side of wall for all ducts passing thru similar construction.

Sleeves Thru Fire-rated Surfaces:

All sleeves in fire walls and surfaces shall be packed inside after pipes or ducts have been placed with fire safing insulation. The insulation ends shall be sealed with "duct seal." A 16 gauge galvanized iron metal closure shall be placed on each face of the wall or surface.

Sleeves Thru Floors:

All sleeves thru floors above grade shall be watertight with waterproof caulking around pipes and ducts.

PIPE LOCATION AND ARRANGEMENT:

Unless otherwise noted on the drawings, all water piping shall be kept out of concrete floor slabs and shall be run overhead.

All piping shall be racked and supported to run straight and true.

Piping shall be racked and run to facilitate maintenance work.

Under no circumstances shall valves, shock absorbers, drip traps, or piping specialties be installed in a "closed space" without proper access provided for future service and maintenance.

NOTE: **All piping shall be capped or plugged at the end of each work shift and when not being extended, to prevent the entry of rocks and debris.**

Any time lines are broken or disconnected, they shall be capped immediately after flushing to remove rock and debris from pipes. **If rocks or other foreign materials are found in the system after it has been closed, the contractor shall stand the expense of their removal.**

Pipes shall not be bent to change direction. Approved fittings must be used.

All valves, piping, and equipment to be installed so as to permit disassembly for maintenance purposes. Provide drain valves at all low points in piping systems. Run to floor drain, where possible, otherwise provide 3/4" hose connection with vacuum breaker.

PIPE GRADING AND SLOPE:

Piping shall be uniformly graded in direction of flow as noted below:

PIPING	FALL/RISE	DIRECTION	PER/RUN
Water	1"	Up	40'
Waste - 4" & smaller	1"	Down	4'
Condensate Drip	1"	Down	4'
Vent	1"	Up	4'
Heating Water	1"	Up	40'
Chilled Water	1"	Up	40'

VIBRATION ISOLATION:

All mechanical equipment over 5 H.P. shall be isolated in accordance with Table 27, Chapter 52, in the 1987 ASHRAE Guide and Data Book Systems Volume.

Piping and ductwork in the Mechanical Room and for the first three (3) support points away from remotely located mechanical equipment shall be isolated with Type 2 isolators with a minimum deflection of 1.0 inches. Isolators for upper floor equipment shall be selected from the "30' Floor Span" column. All vibration isolators and equipment bases shall be of the same manufacture.

Extreme care shall be taken by this contractor to prevent the transmission of vibration from equipment to building structure. Flexible connectors shall be installed in all piping connecting to moving equipment, such as pumps, air handling units, compressors, etc.

Flexible connection shall be specifically designed to absorb noise and vibration and to prevent damage to equipment caused by piping stress. Unit construction shall consist of heavy bellows type neoprene rubber hose sections with stainless steel liners and attachments to match piping.

PART 2 - PRODUCTS

PIPING SYSTEMS:

All piping shall be in accordance with the American Society for Testing and Materials, ASTM A-53. No foreign made piping will be accepted in this construction.

Culinary cold and hot water above grade shall be Type "L" copper with soldered wrought copper fittings.

Rainwater and waste piping above grade shall be standard weight hub and spigot or no-hub for sizes 2" and larger; and galvanized Schedule 40 for 1-1/2".

Heating hot water piping and chilled water piping above grade shall be Schedule 40 black steel pipe.

Condensate drip lines shall be Type "M" copper with soldered wrought fittings.

Exposed piping, fittings, valves, and trim at plumbing fixtures shall be chrome-plated.

Cleanout covers in finished walls shall be chrome finish. Floor covers shall be polished bronze or other, as specified.

HANGERS AND SUPPORTS:

Vertical Piping:

Attachment - Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and to carry the weight of the pipe and contents. Stacks shall be supported at their bases, and if over two (2) stories in height at each floor by approved metal floor clamps.
Cast iron soil pipe shall be supported at not less than each story height and at its base.

Screwed pipe (IPS) shall be supported at not less than every other story height.

Copper tubing shall be supported at each story for piping one and one-half (1-1/2) inches in diameter and at not more than six (6) foot intervals for piping one and one-quarter (1-1/4) inches in diameter and smaller.

Horizontal Piping:

Supports - Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

Cast Iron Soil Pipe - Where joints occur, soil pipe shall be supported at not more than 5-foot intervals, except that where 10-foot pipe lengths are used, supports at 10-foot intervals are acceptable. Supports shall be placed within eighteen (18) inches of the hub or joint.

Screwed pipe (IPS) shall be supported at approximately 12-foot intervals.

Copper tubing shall be supported at approximately 6-foot intervals for piping one and one-half inches and smaller in diameter and at 10-foot intervals for piping two inches and larger in diameter.

Hangers shall be Grinnell Figure 260 for both bare and insulated pipe.

Where roller type supports are used, they shall be Fee & Mason Figure 169 chair type or Figure 170 suspension type, as required. (Provide carbon steel pipe saddles on insulated pipes).

Where piping is run adjacent to walls or steel columns, it shall be supported from steel brackets or vertical channel hangers. Brackets shall be Grinnell Figure PS 732 or PS 3282 as directed, or approved substitute. Channel systems shall be approved for each condition on an individual basis.

Furnish all hangers, inserts, brackets, anchors, guides, sliding supports, etc., and all auxiliary steel necessary for the installation. All supports shall be designed in accordance with the AISC Steel Handbook and painted with one shop coat of primer paint.

Pipe covering protection saddles shall be installed at all pipe hangers which support insulated "hot surface" piping. Saddles shall be tack welded to the piping and shall match the insulation thickness applied.

All suspended copper piping shall be securely supported from the building structure at intervals specified and/or as recommended by the pipe manufacturer. Hanger shields shall be functionally similar to isolators with Grinnell Fig. 97 hangers.

Plumbers' tape, chain, or wire will not be permitted.

VALVES AND STRAINERS:

All valves and strainers shall be by one manufacturer. Approved valve manufacturers are Crane, Stockham, Jenkins, Walworth, W. C. Norris, or Powell. Crane numbers are used for convenience.

Domestic Hot and Cold Water:

Gate Valves - Valves 2" and smaller shall be Crane No. 428, bronze, screwed, 200# WOG gate valve with solid wedge disc and rising stem.

NOTE: If unable to use a rising stem valve because of insufficient clearance, use a Crane No. 438 nonrising stem valve.

Valve 2-1/2" and larger shall be Crane No. 465-1/2" iron body, flanged, 200# WOG, OS&Y with bronze trim and rising stem.

NOTE: If unable to use a rising stem valve because of insufficient clearance, use a Crane No. 461 nonrising stem valve.

Globe Valves - Valves 1-1/2" and smaller shall be Crane No. 7TF, bronze, screwed, 200# WOG globe valve with a replaceable teflon disc and teflon packing. The disc shall be suitable for hot water up to 360 degrees F at 150 psi.

Check Valves - Valves 1-1/2" and smaller shall be Crane No. 37, bronze, screwed, Y-pattern 200# WOG swing check valve. Valves 2" and larger shall be Crane No. 373.

Butterfly Valves - Valves 2-1/2" and larger shall be Crane No. 23N-BRB iron body and bronze or stainless steel disc, lug type, stainless steel stem, 200# WOG EPT Nordel seat rated at 275 deg. F butterfly valve.

NOTE: Valves 3" and smaller shall be equipped with the proper size Multi-lock hand lever. Valves 4" and larger shall be equipped with the proper size Extra Power Manual gear operator.

Ball Valves - For hot and cold domestic water service: Valves 2" and smaller shall be Crane No. 2190H, bronze, screwed, 200# WOG, Gem ball valve with Buna-N rubber capsule. Watts B6000 or Apollo 70-100.

Strainers - Strainers 1-1/2" and smaller shall be Crane No. 988-1/2, iron body, screwed Y-pattern, 200# WOG, sediment separators with a 20-mesh Monel screen.

All strainers shall be installed with fine mesh supplementary 'construction screens' which shall remain in place while the system is flushed and chemically cleaned. The 'construction strainer' basket shall be removed just prior to balancing the water systems.
Provide blow-down ball valve on all strainers same size as strainer tapping.

BACKFLOW PREVENTERS:

Backflow preventers shall comply with requirements of the International Plumbing Code as to type, style, size, location, and arrangement for the actual installed duty.

Where backflow preventers are installed which release water thru the valve to the atmosphere, these units shall be provided with drip pans which collect the free water. The drip pans shall be piped to the nearest drain.

All backflow preventers shall be installed with the necessary isolation valves and test cocks.

AUTOMATIC VALVES AND WELLS:

The mechanical subcontractor shall install the automatic temperature control valves, temperature sensing wells, and flow switches, as directed by the automatic temperature control subcontractor.

UNIONS:

Ground joint unions shall be installed on pipe 2-1/2" and under where indicated on drawings. Whenever piping is connected to a major piece of apparatus, unions shall be provided as near as practical on each side of the apparatus.

ISOLATION FITTINGS:

Approved isolation fittings shall be installed at the junction of all copper and steel piping to prevent electrolytic action. Fittings shall be as manufactured by Walter Vallett Co., Corrosion Services, or approved equal.

V-BELT DRIVES:

Capacity of V-belt drives at rated RPM shall be not less than 150 percent of motor nameplate horsepower rating.

V-belt drive combinations shall be limited to A, B, C, and fractional horsepower belts. 3V, 5V, and 8V belts and sheaves shall not be used.

Drives requiring single belt application shall be of the adjustable pitch type. Multiple belt drives shall be of the non-adjustable type. All fixed pitch sheaves, including single groove fan sheaves, shall be of the bushed type. Fixed bore sheaves will not be acceptable for non-adjustable pitch sheaves.

HEATING CABLE:

Furnish and install complete electrical heating cable on all pipe and fittings located in parking area. Heat cable shall be of the self-regulating low temperature type with a heat output of 8 watts/ft. (27 BTUH/ft), and a weather-proof PVC sheath. The heating cable shall automatically adjust heat output to correspond with the heat loss rate. Cable shall be UL and FM approved for use in rainwater downspout ice melting applications, and for freeze protection on exterior piping systems.

Cable system shall be furnished with power termination, end seal kits, splice and tee fittings, and all accessories required for a complete installation.

Thermon, Raychem, or prior approved equal.

MAGNETIC STARTERS:

Contractor furnishing packaged equipment with motors 1/2 HP and larger in size shall furnish factory-mounted magnetic starters on all motors. Magnetic starters shall provide both overload and undervoltage protection and shall have integral hand-off-auto switches, auxiliary contacts, and pilot. All motors installed under this contract shall have a disconnect switch in the immediate vicinity of the motor. Starters on three phase motors shall protect all three legs of the circuit. Starters to be Cutler-Hammer, Square "D," Westinghouse, or Furnas.

Starters for all motors on other than "packaged equipment" which are furnished under the mechanical section of the work will be furnished and installed by the electrical contractor. Starters shall be two-speed or explosion-proof type where required. Provide a heater index bound in the O & M manuals for all starters furnished on the project.

PART 3 - EXECUTION

TESTING:

All piping shall be tested in accordance with Section 15042 prior to applying insulation or concealing in partitions, wall, etc.

ACCESS:

All valves and equipment shall be located to allow easy access for inspection, test and balance, and operation. If valves are installed in inaccessible locations it shall be this contractor's responsibility to furnish and install access doors of a type approved by the owner's representative.

Locate piping, valves, etc., to allow easy access to and maintenance of equipment. Do not block walkways or tube-pull space in equipment rooms.

LOCATIONS & ARRANGEMENTS:

All pressure gages and thermometers shall be so installed so to be easily removable from an eye level 5'-6" above the floor.

Test plugs on flow measuring stations shall be unobstructed, and shall be arranged in the piping per manufacturer's recommendations.
All equipment and accessories shall be installed to facilitate proper service and maintenance in compliance with the manufacturer's recommendations.

GREASING AND OILING:

Prior to placing the equipment in operation, the bearings on all motors, fans, pumps, etc., shall be properly lubricated with a lubricant suitable for the service.
Lubrication instruction tags are to be left on "all" bearings and equipment for the Owner's future use. Only lubricants recommended by the equipment manufacturers shall be used.

It shall be incumbent on the contractor to operate the building equipment used for temporary heat, etc., in a prudent manner to insure that when the building is turned over to the Owner, all equipment is in a "first class" condition.

Equipment shall not be operated unless:

1. All safety devices are installed and functioning properly.
2. Filters are in place on fan systems. Filters to be new and clean.
3. Equipment is properly greased and oiled.
4. Belts and drives are properly aligned and adjusted.
5. The owner's representative has given written approval.

The contractor shall maintain a current "equipment maintenance" chart in the construction shack of the construction manager at all times. This chart shall be posted in a conspicuous place and shall include all items of maintenance necessary for proper operation of the equipment.

PIPE JOINING:

All steel pipe under 2" in size shall be joined by screwed connections.

Welded ends shall be plain beveled. Welding fittings must be employed if welding is used. Branch connections shall use Weldolets or Thredolets. Welding work shall be done by certified and experienced mechanics. All joinings shall be made to maintain the full metal strength of the pipe, with neat and workmanlike appearance. Also, slag shall be removed from the inside of pipe before welding branch connection. All piping must be perfectly clean before system is filled. Welded scrap pipe will not be acceptable.

Victaulic couplings, fittings, and valves may be used for heating water, and chilled water piping in accordance with the manufacturer's recommendations.

SCREWED CONNECTIONS:

All pipe shall be reamed at the ends and free of all inside scale or burrs. Threads shall be cut clean and sharp, and to a length equal to 1-1/8 the length of the female thread receiving the pipe. The pipe shall be screwed in the full length of the female thread.

Pipe shall be made tight with teflon thread tape or thread lubricant worked into male thread only. Surplus material shall be wiped off and the joint left neat and clean. Lubricant shall be powdered graphite and linseed oil, and plumbage and linseed oil.

SWEAT CONNECTIONS:

Copper piping in domestic water service: Piping shall be cut (with a pipe cutter) so ends are square and will "bottom" in fittings. There must be no gaps left thru which solder can run into the line. If a hack

saw must be used, it shall be guided with a miter box to insure a square, even cut. Tubing shall be reamed to remove burrs, being careful not to expand tubing while reaming.

The outside of the copper pipe and the inside of the fittings, where solder will be applied, shall be burnished. Fine crocus cloth or fitting brushes should be used until all dirt and oxide is removed.

A light coat of soldering flux shall be applied to both pipe and fittings. Acid flux shall not be used.

Joints shall be uniformly heated to proper soldering temperature to insure that solder will flow to all parts of the joint. The solder shall be fed to the joint until a uniform line of solder appears around the pipe at the end of the fittings.

Piping shall be joined with 'Stay-Safe-50' or 'Silvabrite-100' no lead solder.

When valves are being installed, the non-metallic parts shall be removed to prevent the heat of soldering from damaging the valves. No heat shall be applied near where an excessive temperature may cause damage.

MOTORS AND STARTERS:

This contractor shall furnish all motors required and necessary to operate equipment furnished by him. The voltage, phase, and horsepower of each motor shall be coordinated with the electrical contractor prior to ordering.

SECTION 15180 - INSULATION

PART 1 - GENERAL

WORK INCLUDED:

It is the intent of this section of the specifications that all hot (above 105° F) and cold (below 55° F) surfaces of all piping and mechanical system components be insulated, unless specifically excluded herein.

Systems to be insulated:

1. Supply air ductwork
2. Exhaust air ductwork
3. Culinary hot and cold water piping system
4. Hot water and waste piping below handicapped lavatories and sinks
5. Fresh air ductwork
6. Heating hot water piping systems
7. Chilled water piping systems
8. Trap primer waters

The providing of all materials, supplies, equipment, tools, transportation, and facilities and performing all labor and service necessary to provide the work outlined above and as shown on the working drawings.

PART 2 - PRODUCTS

COMPLIANCE:

All insulation shall conform to the requirements of the building code and have a flame spread rating of less than 25 and smoke developed less than 50.

Insulation shall be as manufactured by Schuller, Owens-Corning, Knauf, Armstrong, or Certainteed.

DOMESTIC HOT AND COLD WATER PIPING:

All piping shall be insulated with 2-piece heavy density pipe insulation having an average "K" factor of .25 BTU at 70 degrees F mean, with all-service jacket. Thickness of insulation shall be as follows:

INSULATION THICKNESS IN INCHES FOR PIPE SIZES

PIPING SYSTEM TYPES	FLUID TEMP. RANGE, F	RUN-OUTS 2"	1" & LESS	1-1/4" TO 2"	2-1/2" TO 4"	5" TO 6"	8" & LARGER
HEATING AND DOMESTIC HOT & COLD WATER SYSTEMS							
Low-Temp	40-200	1/2	1	1	1-1/2	1-1/2	1-1/2

Pipe insulation shall be fastened with self-sealing adhesive strip edge. The insulation shall be covered with an all-service jacket.

Fittings shall be insulated with mitered segments of insulation material wired in place and finished with a 1/4" layer of insulating cement. Flanges and valves shall be insulated with removable and replaceable covers fabricated from oversized pipe insulation and finished with an all-service PVC jacket.

Valves shall be insulated as specified for fittings.

HOT WATER & WATER PIPING EXPOSED BELOW LAVATORIES:

Insulate all exposed surfaces with 1/2" thick flexible foam insulation.

HIGH AND LOW PRESSURE RIGID ROUND DUCTS:

All rigid round metal ducts shall be wrapped with 1-1/2" thick fiberglass duct wrap with factory-applied vapor barrier. All joints shall be sealed with mastic and taped to form a neat and complete insulation system.

RECTANGULAR DUCT LINING:

The interior surface of all low pressure supply, return, fresh, relief, and exhaust air ducts (except where noted otherwise), shall be lined with 1" thick fiberglass dual density duct liner, having an average "K" factor of .23 BTU at 75 deg. F mean. The liner shall meet standards NFPA No. 90A and No. 90B, shall have an interior liner resistant to microbial growth per ASTM G-21 and ASTM G-22, and shall have the Underwriters' Laboratories, Inc., label.

Duct liner shall be applied to the flat sheet with a 100% coverage of duct adhesive. The duct liner shall be cut to assure snug corner joints. The black surface of the line shall fact the air stream. On horizontal runs, tops of ducts over 12" in width and sides over 16" in height shall be additionally secured with welded pins and speed clips on a maximum of 15" centers. On vertical runs, gripinails or welded pins and speed clips shall be spaced on a maximum of 15" centers on all width dimensions over 12". Pins shall start within 2" of all cross joints within the duct sections. Welded pins shall be cut virtually flush with the liner surface. Clips should be drawn down flush only and not so as to compress the liner and cause the leading edge to raise. All exposed edges and the leading edge of all cross joints of the liner shall be coated with adhesive.

PART 3 - EXECUTION

GENERAL:

The contractor shall provide a complete installation which is neat in appearance and functional. Remove all excess materials and packaging from job site.

All insulation shall be continuous through wall and ceiling openings and through sleeves. Insulation on all cold surfaces where vapor barrier jackets are used will be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces must be adequately insulated and vapor-sealed to prevent condensation.

Elbows, valves, and fittings inside the building shall be insulated as specified for the piping systems and covered with high temperature P.V.C. insulation fitting covers, or alternate method approved by the Architect/Engineer.

Insulation inserts and shields shall be installed on all cold fluid piping systems such as roof drain lines and domestic cold water piping at the hanger supports.

Inserts between the pipe and pipe hangers shall consist of rigid calcium silicate pipe insulation of equal thickness to the adjoining insulation and shall be provided with vapor barrier, where required. Insulation inserts shall not be less than the following lengths:

1/2" to 2-1/2" pipe size	6" long
3" to 6" pipe size	9" long
8" to 10" pipe size	12" long
12" and over pipe size	18" long

NOTE: Rigid insulation shall have characteristics suitable for temperature, moisture and load conditions of the particular pipe being supported.

Rigid metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and length specified for the insulation hanger inserts.

Vapor barrier wrap shall be sealed tight and not penetrated by the hanger or shield. Specified adhesives, mastics, and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon. Where insulation pipes pass thru sound or fire-rated walls, floors, or ceilings, the insulation sleeves shall be sound or fire-rated to match rating of surface penetrated.

INSULATION WORKMANSHIP:

All insulation shall be applied by specialists experienced in the field, and shall be neat in appearance. Neatness in appearance shall be equated to proper insulation application procedures, and sloppy workmanship will not be tolerated. Work which is deemed unacceptable shall be condemned, removed, and replaced at the contractor's expense. Protect floors, valve handle, accessories, etc., to keep paste off areas not being insulated.

CLEAN UP:

The piping shall be cleaned and tested prior to installation of insulation, and fittings shall be cleaned after insulation is installed.

SECTION 15400 - PLUMBING

PART 1 - GENERAL

SCOPE OF WORK:

Piping diagrams indicate runs, and are intended to be complete. Where fixtures are not shown connected to any services required, they shall be connected properly and completely. Connect all fixtures to various services, i.e., hot water, cold water, waste, vent, etc., as required. The work shall include furnishing of all materials and labor required for the job as described, together with all minor items implied or required to finish the entire work, and generally as follows:

1. Plumbing fixtures and piping.
2. Sanitary sewer systems.

STANDARDS:

Plumbing installation shall be made in accordance with the International Plumbing Code, City Code, and all other applicable governing codes.
In event drawings violate the codes, the contractor shall base his estimate on the code requirements.

See schedule on plans for sizing branch water lines to fixtures.

DISINFECTING:

After flushing the mains, introduce a water and chlorine solution concentrated to 300 P.P.M. to disinfect the system and oxidize piping contaminants. Retain treated water and chlorine for a period of not less than three hours or more than six hours before final flushing out of system.

All valves should be opened periodically during the process and the residual chlorine checked to insure that at least 50 percent of the initial concentration is present to complete the disinfection. If there is less than 50 percent, the valves should be allowed to drain water until the 50 percent or greater level is obtained. A make-up chlorine solution of a concentration equal to the initial concentration must be added, as needed, during the withdrawal of the spent solution.

A warning sign shall be conspicuously posted at each water outlet and faucet during the disinfecting process to prevent occupants from drinking the water.

VERIFICATION OF GRADE:

The contractor shall excavate the point of actual connection of waste piping systems to the existing mains, and **shall verify the actual elevation** and location prior to the installation of building footings or any plumbing piping.

PART 2 - PRODUCTS

CLEANOUTS:

Approved cleanouts shall be installed in the base of each vertical drainage line, and in the horizontal line at each change in direction. In addition, there shall be cleanouts spaced at a maximum of 50' in all horizontal lines. All cleanouts shall be extended to accessible surfaces.

WATER HAMMER:

Provide and install stainless steel bellows type shock absorbers in the ends of all multiple fixture water lines and in piping ahead of snap-acting automatic valves.

Absorbers shall be sized and located in compliance with manufacturer's recommendations for the specific application. Absorbers shall be Zurn, Wade, or Smith.

Absorbers shall not be installed in inaccessible areas. Extend piping to accessible location.

PLUMBING FIXTURES:

The contractor shall furnish and install all fixtures shown or specified hereinafter and make all parts complete and leave the entire system in perfect working order. He shall clean and adjust all fixtures before leaving the job. Any damaged or cracked fixtures shall be replaced at the contractor's expense.

The fixtures shall be all new and complete as shown or described in catalog or required for the work, including accessible loose key ¼ turn ball valve compression stops above the floor in supplies to all fixtures, and cast brass P-traps, unless otherwise shown. Trim for all fixtures shall be chrome-plated, and all trim shall match in design. Supply faucets shall have renewable seats and barrels.

Fixtures shall be Kohler as specified or approved substitutes of Eljer or Crane. Specialties shall be J. R. Smith, as specified, or approved substitutes of Wade, Josam or Zurn.

PLUMBING FIXTURES

WC-1	Water Closet:	Kohler K-4330-6 'Kingston' siphon jet, wall hung, elongated bowl, 1-1/2" top spud; Sloan Optima Plus #8111-MC flush valve; K-666C 'Lustra' extra heavy solid plastic white open front seat with stainless steel check hinge; Wade W-311 (horizontal) or W-331 (vertical) series carrier, single or double right or left as required, with foot support. See architectural plans for mounting height.
WC-2	Water Closet: (Handicapped)	Same as "WC-1"

U-1	Urinal: (Handicapped)	Kohler K-5016-T "Dexter" wall hung, siphon jet, and 3/4" top spud. Optima Plus #8186-1.0-MC battery powered sensor operated flush valve. Provide carrier and chrome plated pipe where exposed above fixture. Provide spare battery for each urinal.
L-1	Lavatory: (Handicapped)	Kohler K-2032 "Greenwich" 20" x 18" - 4" center set vitreous china, front overflow, self-rimming. Optima Plus #EBF-650-A battery powered sensor operated faucet with grid strainer, tailpiece and flexible supplies w/stops and brass P-trap. Support lavatory with Zurn ZN1231 concealed arm carrier with foot support. Control module to be centered on wall as high as possible below lavatory. See architectural plans for mounting height.
S-1	Sink:	Just CDL-2133-B-GR 33" x 21" x 7" deep with (2) each 16" x 14" bowls, 20 ga. stainless steel self-rimming sink, soft satin finish with 3-hole flush fittings deck and sound dampening. Moen #8710 single handle, 8" centerset swing spout kitchen deck faucet, vandal-proof aerator, flexible supplies, crumb cup strainer with the tailpiece and brass P-trap. Provide an In-Sink-Erator Model 555SS, 3/4 H.P., 120/1/60 stainless steel disposer in R.H. compartment. Disposer to have a 5-year parts and labor warranty.
DF-1	Elec. Water Cooler:	Wheelchair access, wall mounted, two-level, air cooled, refrigerated type, to cool 8.0 gal/hr. from 80N F. to 50N F. with 90N F. EAT. 1/5 HP hermetic compressor, 120/1/60. Unit shall have 304 stainless steel top w/Flexi-guard safety bubblers and self-closing press bars operable from front and both sides of fountain. Cabinet shall be bonderized steel with stainless finish. Note: Cut electrical cord at time of installation to suit electrical outlet provided. Fountain shall be Elkay EBFATL-8.
HB-1	Hose Bibb:	Chicago Faucet No. 952 (No. 995 where connected to exposed piping) 3/4" hose bibb with No. 293-6 handle and 3/4" threaded outlet with integral vacuum breaker.
FD-1	Floor Drain:	J. R. Smith #2010 2" cast iron drain with nickel bronze top. Drain to have deep seal P-trap with trap primer connection.
TP-1	Trap Primer:	Precision Plumbing Inc. Model TP-1/2" brass trap primer with distributors. See plans for requirements.

LEAD PANS AND WATERPROOF MEMBRANES:

All floor drains shall be fitted with clamping collar and waterproof membrane as required by IPC.

Membrane and lead waterproofing pans for shower and built-up type custodial floor sinks shall be installed by plumbers so they are 100% watertight. Drains shall have clamping device which clamps drain to pans. There shall be a mastic seal between floor drain bottom and lead or membrane so when clamping device is tightened, there is a complete watertight seal.

Care should be taken not to clog weep holes. All pans will be tested by placing test plug in drain and filling with water overnight.

CONDENSATE DRAIN:

All refrigerated air conditioning which has cooling coil condensate drip pans with pipe connections shall be piped to the nearest drain by this contractor.

Pipe location and routing shall be approved by the owner's representative.

Piping shall be the same size as the drain pan connection, and shall be trapped to prevent forced air flow thru the pipe.

VACUUM BREAKERS & BACKFLOW PREVENTERS:

Vacuum breakers and backflow preventers shall comply with requirements of the International Plumbing Code for the actual installed duty.

Vacuum breakers and backflow preventers shall be of the type, style, and arrangement approved by the Code.

All vacuum breakers and backflow preventers shall be installed with the necessary isolation valves and test cocks. Backflow preventers shall be mounted a maximum of 60" above floor level.

Reduced pressure backflow preventers shall be tested by a certified backflow preventer testing agent.

PART 3.00- EXECUTION

PRODUCT HANDLING:

Protection:

Use all means necessary to protect plumbing materials before, during, and after installation and to protect the installed work and materials of all other trades.

Replacements:

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

TESTING:

Furnish all required personnel and equipment and make all tests required to receive the approval of the Owner and all agencies having jurisdiction.

CLEANING UP:

Prior to acceptance of the building, thoroughly clean all exposed portions of the plumbing installation, removing all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

WATER CLOSET INSTALLATION:

General: Install water closets as shown on the drawing and as follows:

1. Supply pipe extending from wall shall be covered by chrome plated sleeve and wall flange.
2. Additional wall plates shall be provided where each pipe extends through finished wall.
3. Two rubber or plastic seat bumpers with metal holders shall be provided and secured to the wainscot behind the fixture.
4. The centerline of the flush valve shall be on the centerline of the fixture, 39 inches above the finished floor and a minimum of 2-1/4 inches from the wall.
5. Chrome plated pipe support shall be provided on the long flush pipe outlet and shall be secured rigidly to the wall with suitable anchors.
6. The backflow preventer for the flush valve shall be installed at the discharge of the valves.
7. The flush valve water piping concealed in the partition shall be rigidly supported; piping between flush valve and wall shall be provided with a factory fabricated chromium plated spacer sleeve and wall flange.

LAVATORY INSTALLATION:

General: Install lavatories as shown on the drawings and as follows:

1. Lavatories for use by wheelchair handicapped shall be installed with a minimum rim height of 34", a minimum vertical clearance of 29" from floor, and a minimum clear knee recess of 30" in width and 20" in depth.
2. Trap on lavatory for use by wheelchair handicapped shall be installed so as to provide maximum clearance under bowl. Exposed waste, trap and hot water supply under lavatory shall be insulated in accordance with the requirements for domestic hot water piping.
3. All lavatories shall be installed with a rim height of 34".

URINAL INSTALLATION:

General: Install urinals as shown on the drawing and as follows:

1. Supply pipe extending from wall shall be covered by chrome plated sleeve and wall flange.
2. Additional wall plates shall be provided where each pipe extends through finished wall.
3. The centerline of the flush valve for wall hung urinals shall be on the centerline of the fixture, 45 inches above the finished floor and a minimum of 2-1/4 inches from the wall.
4. The centerline of the flush valve for handicap urinals shall be 40 inches or less above the finished floor.
5. The backflow preventer for flush valve shall be installed at the discharge of the valve.
6. The flush valve and the water piping concealed in the partition shall be rigidly supported; piping between flush valve and wall shall be provided with a factory fabricated chromium-plated spacer sleeve and wall flange.

FIXTURE CONNECTIONS:

Service Sinks: Provide connections between soil pipes and floor connected service sinks made with cast-iron floor flanges.

Connection sizes shall be 3-inch for service sinks.

Floor flanges shall be slipped over the ends of the pipes and caulked in position.

Special short radius fittings shall be used where space does not permit the use of standard fittings below the flanges.

Setting Compounds and Gaskets: Provide watertight and gas tight seals between flanges and fixtures with plumbing-fixture-setting compound or manufacturer's standard non-asbestos gaskets.

Neither rubber gaskets nor putty shall be used in sealing connections.

FIXTURE SUPPORTS:

Urinal Support: Provide urinal chair carriers consisting of a pair of cast-iron feet bolted to or imbedded into the floor together with 1.66-inch outside diameter (minimum), steel tubular upright members, steel hanger support plate, and steel bearing plate connected to cast iron or steel adjustment sleeves and furnished with necessary bolts, nuts, washers, and chrome plated trim. Provide chair carrier that is fully concealed in the building construction and that supports the fixture in such a manner that no part of the fixture will be supported by the wall or the partition.

Lavatory Support: Provide lavatory chair carriers consisting of a pair of cast-iron feet bolted to or imbedded into the floor together with 1.66- inch (minimum) steel tubular upright members, a horizontally adjustable alignment truss or tie rod at bottom and another at the top connected to cast-iron or steel adjustment sleeves and painted cast-iron or steel adjustment sleeves, and painted cast-iron concealed arms.

STRAINER INSTALLATION:

General: Place strainers ahead of pressure reducing valves, automatic control valves, pumps, and elsewhere as indicated on the drawings or specified.

BACKFLOW PROTECTION VALVE INSTALLATION:

General: The entire water distribution system shall be protected against contamination due to backflow from non-potable sources. Each connection to a fixture or an item of equipment shall be protected in accordance with the requirements of the International Plumbing Code.

Reduced Pressure Zone Backflow Preventer: Install a reduced pressure zone backflow preventer in the building water supply main to expansion tanks, condenser water systems, and boilers as shown on the drawings and/or as required by the local codes.

INSTALLATION OF PIPE SLEEVES:

Basic Requirements: Install pipe sleeves as follows:

1. Pipe sleeves shall be provided for all pipes passing through walls, slabs on grade and floors. Sleeves may be omitted where pipes pass through exterior walls above ground to lawn faucets, wall hydrants and downspout nozzles.
2. Sleeves for pipes passing through exterior walls and slabs on grade which do not have membrane waterproofing shall be of cast-iron or galvanized steel pipe or black steel pipe, Schedule 40.
3. Sleeves for pipes passing through exterior walls, slabs on grade and floors which are provided with membrane waterproofing shall be of threaded galvanized steel pipe fitted with companion flanges and arranged to secure membrane. Companion flanges shall be drilled and tapped in such a manner that bolting is effected from the outer (or upper) face only.
4. Sleeves for pipes passing through potentially wet floors that do not have membrane waterproofing such as in toilet rooms, cafeteria kitchens, serving areas, dishwashing rooms, utility cores, mechanical equipment rooms, and areas that are provided with fire protection sprinkler systems, shall be galvanized steel pipe, shall project 2 inches above the finished floors, and shall be caulked watertight.
5. Sleeves for pipes passing through all other floors and walls shall be constructed of galvanized or black steel pipe, standard weight.

Sleeves On New Work: On new work, sleeves shall be built into the walls and floors as the work progresses.

INSTALLATION OF CLEANOUTS AND FERRULES:

Riser Connection to Sewer or Drain: Where soil, waste, or roof drainage risers connect to a sewer or drain extending from the building above the lowest floor, the fitting at the base of each stack or downspout shall be a sanitary tee or a combination Y and 1/8 bend with cleanout plug in the end of the run of the main.

Test Tees: Each vertical soil, waste, and vent pipe and each downspout and roof drainage pipe which connects to horizontal drain piping below ground shall be fitted with a test tee above the lowest floor or ground. Where accessible, test tee may be installed in the horizontal pipe at the base of the riser.

Cover Plates: Where cleanouts or test tees occur on concealed pipes in finished rooms, they shall be provided with a 1/8-inch thick, machine finished, brass cover plate of sufficient diameter to cover the opening in the finished wall or partition. The cleanout plug shall have a solid head, tapped for a 1/4-inch brass screw to secure the cover plate. Where cleanout plugs extend beyond the wall finish, the cover plates shall be of machine finished brass and shall be only of sufficient depth to fit against the wall to cover plug. Cleanout cover plates shall be painted to match adjacent wall finish.

Cleanouts Plugs For Threaded Fittings: Cleanout plugs for threaded fittings shall be in accordance with ANSI B16.12. Except for test openings, where size must be sufficient to admit test plug, bushings will be permitted on pipes 5-inches and larger to reduce plug size to 4 inches; cleanout plugs for piping 4 inches and smaller shall be the same size as the pipe.

Cleanout Plugs For Hub-and-Spigot Fittings: Cleanout plugs for hub-and-spigot fittings shall be screwed into ferrules caulked into the fitting. Ferrules and plugs shall be in accordance with ANSI B16.12, except that plugs required to be flush with the floor shall have square countersunk heads in lieu of raised heads.

WATER PIPING INSTALLATION:

General: Water piping shall be complete from service connection to all fixtures and equipment outlets. Sizes of pipes shall be as shown or specified.

Reaming: Ends of pipes and tubes shall be reamed before being made up.

Threaded Joints: Threaded joints shall be made up metal-to-metal, with a noncorrosive lubricant applied to the male thread only. Lampwick or other packing material shall not be used in making up threaded joints.

Chromium Plated Piping: Chromium plated piping shall be threaded and made up carefully, and not more than one full turn of thread shall be exposed beyond any fittings.

Long Screws and Bushings: Long screws and bushings (other than bushings cast in the sand) shall not be used on water piping.

Soldering: Ends of tubing and recesses of fittings to be soldered shall be thoroughly cleaned. Joints shall be assembled without binding. Solder shall penetrate fully and shall fill the joint completely. Joints shall be made using lead-free solder, as specified.

Joint Materials: All joint materials shall be free from oil, tar, and greasy substances, and shall be dry when placed in the joint. The material shall be handled with care to prevent contamination.

Copper Tubing: All copper tubing shall be free from cuts, dents or other surface damage at the time of final inspection. Damaged tubing shall be removed and replaced with new.

Copper Tube Anchoring: Horizontal runs of copper tubing over 50 feet in length shall be anchored to wall or floor construction. Anchors shall be located near the midpoints of the runs so as to force the expansion equally to the ends or in a direction where expansion can take place without excessive strain.

Swing Joints, Offsets, and Expansion Joints: Swing joints, offsets, and expansion joints shall be provided where necessary to accommodate expansion of piping, which will be approximately two inches in 100 feet of copper hot water piping.

Dielectric Couplings: Where non-ferrous metal piping and zinc-coated metal piping are joined, dielectric (insulating) couplings, fittings or unions shall be provided.

Reducing Fittings: Where pipe sizes shown or specified differ from the connection sizes of meters, pumps, fixtures, outlets, and the like, reducing fittings shall be installed close to them.

Pipe Branches: Branches from water supply mains shall be taken from the top, bottom or side, using crossover fittings where required by structural or operating conditions.

Grading: Hot water supply and hot water circulating lines shall be accurately and uniformly graded to avoid traps which might impede or destroy circulation. All lines shall be graded so as to facilitate drainage.

Unions: Unions shall be installed near points of connection to each piece of equipment, and elsewhere as required for installation of piping, removal and replacement of regulating and control equipment and the like. Right and left couplings or nipples are prohibited.

Water Hammer Arresters: Water hammer arresters shall be provided where indicated on the drawings. Water hammer arresters shall be approved and installed in accordance with the requirements of PDI-WH201 and shall bear the PDI seal of approval.

Roughing: Roughing shall be provided for equipment furnished under other sections of the specifications. Where future extensions are indicated on the drawings, roughing shall extend to within the space to be served, and shall be valved, and capped or plugged.

APPROVED MANUFACTURERS' PRODUCTS:

The following manufacturers, trade-names, and products are approved provided that they satisfy every requirement of the Drawings, Specifications, and all Addenda, and conform to the design, intent, and the quality, and standards specified.

Naming of an "approved manufacturer" does not mean that the manufacturer or product automatically complies with the design documents. Submittals must be acceptable in all respects to the project design team.

PRODUCT	MANUFACTURER
Floor Drains	Watts Drainage, Mifab
Roof Drains	Watts Drainage, Mifab
Carriers	Watts Drainage, Mifab
Trap Primers	Mifab, EBC
Water Coolers	Halsey Taylor, Haws, Sunroc
Sinks and Fittings	Elkay
Toilet Seats	Beneke
Faucets and Fittings	T&S
Flush Valves	Geberit
Faucets	Chicago

SECTION 15500 FIRE PROTECTION

PART 1 - GENERAL

GENERAL CONDITIONS:

The requirements of Section 15010, 15030, 15050, and 15900 shall govern the work in Section 15500, where applicable, and where not in conflict with governing codes and ordinances. Division 1 is a part of this and all other sections of these specifications.

SCOPE:

The work required includes the designing, hydraulically calculating pipe sizes, flows, and pressure, furnishing and installation of fire protection systems in accordance with the drawings, specifications, latest standards and codes for complete systems for the building.

The work specified in this section shall be installed by none other than a recognized fire sprinkler contractor. All fire protection system piping shall be hydraulically calculated. All systems shall be subject to the inspection and approval of the local fire authority or his representative for compliance of applicable standards.

All work shall be coordinated with other subcontractors.

The sprinkler system shall consist of the required number of sprinkler heads, piping, hangers, drains, test pipes, alarms, valves, gauges, fire department connections, and all other parts to assure a complete system to meet the requirements of the owner's insurance underwriter, local authority having jurisdiction, and in accordance with nationally recognized standards.

Codes & Standards:

Water Supply: National Fire Code #24 – International Building Code.

Wet Sprinkler System & Combined Systems: N.F.C. #13 and #14 - U.B.C.

Alarm Equipment: N.F.C. #70 & 72A

Standpipe & Hose Systems: N.F.C. #14 - U.B.C.

Supervision: N.F.C. #13 and #14 - U.B.C.

Temporary Fire Protection: N.F.C. #14 - U.B.C.

Sprinkler Heads: N.F.C. #13

Sleeves and Location: N.F.C. #13

Work Included Elsewhere:

Access Doors - By General Contractor.

Color coding or pipe identification - By Mechanical Contractor.

Wiring of flow switches and gate valve supervisory switches - By Electrical Contractor.

WORK BY FIRE PROTECTION CONTRACTOR:

This contractor shall furnish and install all labor, material, and equipment to make a complete and working fire protection system fully tested and approved in accordance with the drawings and standards of this specification.

WATER SUPPLY DATA:

The fire water supply estimated flow data shall be obtained by the Contractor from the Gateway for bidding purposes.

Water Supply:

Fire protection contractor shall perform a flow test at or near site prior to final calculations for system. Flow test to be performed in the presence of local fire marshal.

Connect fire sprinkler mains to capped connections above floor provided by others as shown on the drawings. Coordinate testing and flushing of this portion of the main in accordance with N.F.C. #24 and furnish test certificates to the Owner's representative.

Sprinkler System:

This system shall conform to N.F.C. #13 and #14 and U.B.C. Riser may be calculated, but shall not be smaller than 6". Sprinkler systems are to be light, ordinary, or extra hazard, as required by NFC-13 and the Utah State Fire Marshall's office.
System shall be hydraulically calculated. Sprinkler system shall be light hazard, except for casual ordinary and extra hazard group 1 in storage and service areas. Density for light hazard areas shall be 0.10 gpm per sq. ft. over 1500 sq. ft. Remote area with a maximum head spacing of 225 sq.ft. Service area shall be density of 0.15 over 2000 sq. ft. with maximum spacing of 130 sq. ft.

QUALIFICATION OF DESIGNER:

Designer shall be an engineering technician or Senior Engineering Technician (Level III or Level IV), NICET certification for fire sprinkler system design.

QUALIFICATION OF INSTALLER:

It is intended that the system be designed and installed by a firm regularly engaged in the design and installation business of Fire Sprinkler contracting. The Owner's representative may require evidence to support the ability of the contractor to perform work in the scope and volume as specified. A contractor who cannot verify such experience, may be found not suitable to perform the work.

PART 2 - PRODUCTS

HANGERS:

All hangers to be in accordance with NFPA Pamphlet No. 13.

SPRINKLER HEADS:

Sprinkler heads shall be U.L. approved. "K" factors shall be the same on each system and/or floor. See plans for head types.

Sprinklers shall be of the proper temperature rating. Location of sprinkler head wherever reasonably possible shall be symmetrical and coordinated with the ceiling pattern.

Exact number and location of heads shall be determined by the system design, and architectural coordination.

In unfinished areas, sprinkler heads shall be upright rough brass heads on exposed piping.

In all other areas, sprinkler heads shall be pendant type chrome plated heads with off-white escutcheons.

Provide dry pendent heads in areas subject to freezing, only where wet piping can be run in heated space. Otherwise, provide antifreeze loops.

Provide sparehead cabinets in accordance with NFPA No. 13 and equip same with at least ten (10) chrome heads, six (6) brass heads, and appropriate wrenches.

Provide head guards in all areas where heads are subject to physical abuse.

VALVES:

All valves and fittings shall be listed by Underwriters Laboratories or approved by Factory Mutual for fire protection duty and shall be installed in accordance with their listing and/or approval. Control valve shall have alarm supervisory switches with two sets of contacts and normally open/normally closed.

All indicating valves will be of the listed and/or approved type with an electric tamper switch approved for use with that valve.

Water hammer arrestors shall be provided ahead of all automatic valves to eliminate water hammer and shall be installed vertically in an accessible location.

Hose valves off standpipes shall be U.L. approved. All valves shall be 2-1/2" with 2-1/2" X 1-1/2" reducer and cap with chains. Valves shall be polished brass and chrome-plated.

PIPING:

All piping above ground shall be domestic steel pipe and fittings.

Foreign made pipe will not be permitted on this project.

EARTHQUAKE BRACING:

Install earthquake bracing in accordance with NFPA #13 Standards and local Fire Marshall's Office.

SLEEVES:

Sleeves shall be furnished, together with their location and elevations to the construction manager, timely with required schedule or concrete pours. If sleeves are missed by this contractor, he shall be responsible for core drilling thru concrete at his own expense, and he shall be responsible for his cutting and patching. Sleeves shall be of the size, type, and length required by N.F.P.A. codes. See Section 15050 for "Sleeves".

PART 3 - EXECUTION

TEMPORARY FIRE PROTECTION DURING COURSE OF CONSTRUCTION:

This contractor shall provide fire protection as required by N.F.C. #14 - Chapter 8, and shall be coordinated with the local Fire Department.

SHOP DRAWINGS:

Shop drawings, submittals, and hydraulic calculations, as necessary and required, shall be submitted to the Owner's representative for approval prior to incorporating materials or equipment into the work. Shop drawings shall be complete and in accordance with N.F.C. #13, #14, #20, and all applicable standards, submittals, and equipment, valves, flow switches, controls, and other important items shall be complete, showing details, description, and characteristics; hydraulic calculations shall be based on the water system fire flow capacities shown on the drawings and shall show flows, pressures, velocities, pipe size, and equivalent lengths as required for the system.

Calculations shall be arranged in an orderly manner with sufficient reference points for the approving authority to review and approve.

Testing shall be accomplished by this contractor for all required systems, equipment, and appurtenances, as required by the various standards and codes. The Owner's representative shall witness and sign off each item required. This contractor shall furnish required forms.

TESTS:

Install all test pipes and valves as required by NFPA No. 13. Locate inspector's test valves and auxiliary drain valves above ceilings in areas approved by the Architect and provide hose bibb connections. Conduct all tests as required by NFPA Standards and Insurance Services Office and submit copies of completed test forms to the Owner.

All fire sprinkler related tests requiring the witnessing by local authorities will be the responsibility of this contractor. If tests are not run or do not have the proper witness or documentation, then they will be run late and all damage caused by the system, or caused in uncovering the system for such tests, will be borne by this contractor.

The Utah State Fire Marshall shall be notified (in writing) at least three days in advance of the following:

Hydrostatic test and final inspection of overhead, prior to the installation of the ceilings.

GENERAL REQUIREMENTS:

This contractor shall submit complete drawings, hydraulic calculations, and proper documentation to the local authority having jurisdiction and receive their approval before submitting such material to the Owner's representative for final approval. The contractor will be required to show proof of submittal to the Owner's insurance underwriter and local building authorities before installation may begin.

All work of this contractor will be coordinated with other trades to insure minimal changes to the sprinkler system from the designs. Careful coordination of mechanical and electrical ducts, pipe and conduit shall be required. The ceiling cavity must be carefully reviewed and coordinated with all trades. In the event of conflict the installation of the mechanical equipment and piping shall be in the following order: plumbing waste, rainwater, and soil lines' supply, return, and exhaust ductwork; water piping; fire protection piping; and pneumatic control piping.

Every effort shall be required to insure that the heads form a symmetrical pattern in the ceiling with the ceiling grid, the lights, and diffusers and grilles and as shown on the Architect's reflected ceiling plan. Offsets shall be made in piping to accommodate ductwork in ceiling. Heads should be symmetrical and all piping run parallel or perpendicular to building lines. In no case shall sprinkler heads be installed closer than 6" from ceiling grids or closer than approved distances from ceiling obstructions.

All sprinkler piping shall be run concealed unless approved by the Owner's representative. All lines will be run as high as possible so as to not interfere with future changes to ceiling heights or other mechanical

equipment. This contractor will be responsible for all sleeves, core drills, and sealing of penetrations in walls, floors, and structural members to facilitate the installation of the system, however, no holes in, or attachments to structural members will be allowed unless approved by the Owner's representative.

All required drains and test pipes will be installed and finished in a workmanlike manner, terminating at a proper location to accommodate the required outflow without damaging the building or landscaping. Drain and test pipe locations shall be approved by the owner's representative.

All piping and heads located in un-heated spaces shall be installed with a glycol loop system. Coordinate location with the owner's representative. Indicating valves with tamper switches shall be installed and wired as required by code. Coordinate with electrical contractor.

No piping or valve assemblies shall be run exposed in a finished area without the prior approval of the owner's representative.

JOB CLOSEOUT:

This contractor shall assure that all placards, signs, and instruction manuals are in place, and all tests are run before any consideration for final payment will be considered. This includes maintenance manuals, hydraulic calculations placards, spare head cabinets and the proper number of spare heads, and instruction to on-site personnel.

This contractor shall, in addition to the above, furnish the owner one (1) set of reproducibles of the sprinkler system "record drawings" for his project files.

SECTION 15700 HEATING-COOLING

PART 1 - GENERAL

SCOPE:

The installation covers the furnishing and installing of fan coil units, necessary trim and specialties, etc., as specified and shown on drawings and as required to provide the complete heating and air conditioning systems shown on the drawings and specified herein.

PART 2 - PRODUCTS

FAN COIL UNITS:

Furnish and install complete the horizontal and vertical fan coil units shown and specified on the plans.

Vertical units shall be the partially recessed or surface-mounted, as shown on plans, Architectural Series with 16 gauge steel panels, wall guard, and extruded aluminum discharge and return grilles. Units shall have hinged access doors at each side with vandalproof key latches.

Horizontal units shall be the concealed series with discharge and return duct collars.

All units shall have insulated casings, filter sections, F.C. centrifugal fans, 3-speed motors and controls.

Units shall have 4-row hot water coils (see schedule on plans for capacities), coils shall be nonferrous construction with air vents at high points.

Units shall be Airtherm, McQuay, Trane, Carrier or American Air Filter.

CHILLED & HOT WATER COILS:

Furnish and install the cooling and heating coils of capacities as shown and specified on the drawings.

Coils shall be of the extended surface type, fabricated of copper or brass tubing not less than 5/8" diameter with plate-type fins of copper or aluminum extending at right angles to the centerline of the tubes. Pressure parts of the coils shall be constructed and tested for a working pressure of not less than 200 psig.

Each coil section shall be mounted in a die-formed, 16 gauge, zinc-coated steel casing with mounting flanges.

All coils shall have inlet, outlet, vent and drain connections for each section and shall have all connections at the same end.

Coils shall be Trane, McQuay, AAF or Carrier.

IN-LINE PUMPS: (CP-1 & CP-2)

In-line pumps shall be of the electric motor driven type, of the capacities specified on the drawings.

Pumps shall be single stage, single suction, centrifugal type with hydraulically balanced impeller. All pumps shall be bronze fitted throughout with a cast iron casing and stainless steel shaft. Pumps shall be provided with mechanical seals and pump and motor shall be direct connected or provided with a spring dampened coupling.

Pumps shall be Armstrong, Bell & Gossett, or Taco.

PART 3 - EXECUTION

COORDINATION:

All equipment and piping shall be arranged to allow for easy maintenance and access to service valves.

Provide valves and unions or flanges at all pieces of equipment to allow maintenance.

Install all control dampers, sensors, etc., as directed by the control contractor.

PROTECTION AGAINST THE ELEMENTS:

The contractor shall, at all times, take reasonable and adequate precautions to protect his work and all stored materials and equipment from damage by the elements, including flooding, windstorms, etc., and shall not expose the work of any other contractor to such damage.

SECTION 15800 - AIR DISTRIBUTION

PART 1 - GENERAL

SCOPE:

Work shall include supply, exhaust, and ventilation duct systems and all materials, equipment, and labor required to complete the systems shown on plans and specified herein.

PART 2 - PRODUCTS

Construct all ducts, plenums, etc., of the gauges specified in the latest editions of the applicable SMACNA Manuals, unless otherwise shown. Sheets shall be free from blisters, slivers, pits, and imperfectly galvanized spots. Construct ducts using double or Pittsburgh corner seams. All seams shall be hammered and made airtight.

Joints shall be fabricated 100% airtight at 2" H2O S.P., using a joint system similar to "Duct Mate" or Lockformer with gasketed joints.

Duct construction details shall comply with the latest edition of the SMACNA "Low Velocity" sheet metal and duct manuals.

Cross Breaking:

Sheet metal ducts shall be cross broken on the four sides of each 4' panel. All vertical and horizontal sheet metal barriers, duct offsets, elbows, as well as 4' panels of straight sections of ducts shall be cross broken. Cross breaking shall be applied to the sheet metal between the standing seams or reinforcing angles; the center of cross break shall be of the required height to assure surfaces being rigid.

DUCTWORK:

Curved elbows shall have centerline radius equal to 1-1/2 times the width of duct. Vanes shall be single thickness installed where shown. Air turns shall be installed in abrupt elbows and shall consist of curved metal blades or vanes with extended trailing edges arranged so as to permit air to make abrupt turn without appreciable turbulence. Air turns shall be quiet and free from vibration when system is in operation.

Sheet metal ducts shall be properly braced and reinforced with galvanized steel angles or other structural members, and where they protrude above roof, they shall be properly flashed. Internal ends of all slip joints shall be installed in direction of flow. Snap lock seams will be permitted on duct gages 22 ga. and lighter.

Dimensions:

Ducts, unless otherwise approved, shall conform accurately to the dimensions indicated on the drawings, and shall be straight and smooth on the inside with joints neatly finished. All duct sizes are free area inside dimensions. Acoustically lined ducts shall have outside dimensions increased, as required, to accommodate the acoustic lining specified and still maintain the face area inside dimensions shown on the drawings.

Field Verifications:

No ductwork shall be fabricated without first field verifying that the available space under actual job conditions will permit installation of the ductwork without structural or other conflicts.

Access Doors:

As indicated on the drawings, for proper access to fan plenum spaces, dampers, filter access spaces, etc., provide and install sheet metal access doors of the size as noted or as required for proper access to the equipment. Those doors shall be constructed of No. 22 gauge metal and as follows:

Door Construction:

Doors shall be provided with a flat iron or angle iron stiffening frame and so constructed that they can be operated without twisting or distortion. Doors on insulated ductwork shall be of double panel construction provided with an approved type insulated filler, not less than 1" thick. The duct opening at each door shall be provided with a continuous reinforcing galvanized bar or angle against which the door will close, this being provided with a sponge rubber gasket to make the door airtight.

Fasteners:

Doors shall be constructed of galvanized iron and shall be airtight. The contractor shall furnish a sample access door for approval before fabrication.

Flexible Connection:

Provide flexible connections, not less than 4" wide, constructed of heavy weatherproof woven "Durolon" glass fabric, at the inlet and outlet connection of each, securely fastened to the unit and to the ductwork by a galvanized iron band, provided with tightening screws.

Test Holes and Duct Ports:

Furnish test holes and duct ports at locations shown on the drawings, and as required for testing of air quantities in ducts. Where these holes are installed in ductwork which is insulated, there shall be provided an extension collar to match thickness of insulation material.

Test holes shall have Young Regulator Model 110 instrument ports. Duct ports shall be Airsan Model SH.

RECTANGULAR DUCT LINING:

The interior surface of all low pressure supply, return, fresh, relief, and exhaust air ducts (except where noted otherwise), shall be lined with 1" thick fiberglass dual density duct liner, having an average "K" factor of .23 BTU at 75 deg. F mean. The liner shall meet standards NFPA No. 90A and No. 90B, shall have an interior liner resistant to microbial growth per ASTM G-21 and ASTM G-22, and shall have the Underwriters' Laboratories, Inc., label.

Duct liner shall be applied to the flat sheet with a 100% coverage of duct adhesive. The duct liner shall be cut to assure snug corner joints. The black surface of the liner shall face the air stream. On horizontal runs, tops of ducts over 12" in width and sides over 16" in height shall be additionally secured with welded pins and speed clips on a maximum of 15" centers. On vertical runs, gripnails or welded pins and speed clips shall be spaced on a maximum of 15" centers on all width dimensions over 12". Pins shall start within 2" of all cross joints within the duct sections. Welded pins shall be cut virtually flush with the liner surface. Clips should be drawn down flush only and not so as to compress the liner and cause the leading edge of raise. All exposed edges and the leading edge of all cross joints of the liner shall be coated with adhesive.

FLEXIBLE DUCTWORK:

Where indicated, runouts above ceiling to the ceiling diffusers may be insulated flexible ductwork. Maximum allowable length is 4'-0" in any given duct run. Duct to be factory fabricated with spring steel wire helix and 1" thick glass fiber insulation covered with external vapor barrier and lined with continuous non-perforated inner sleeve.

Material shall comply with UMC Standard 10-1.

Ductwork shall be Genflex - Type IL.

BRANCH TAKEOFFS:

Branch takeoffs shall be as shown on the drawings, and shall be fitted with adjustable lock balancing dampers, complete with locking quadrants. Where dampers are not accessible for adjustment from above, Young No. 315 or Ventlock 666 concealed ceiling regulators with adjustable chrome-plated covers shall be provided.

H.E.T. duct branch fittings shall be fabricated from 26 ga. G.I. for fittings 8" dia. and smaller, and from 28 ga. G.I. for fittings larger than 8" dia. Fittings shall have attachment flange, and duct collar with locking quadrant balancing damper. Fittings shall be Precision Air, Genflex, or Metals Mfg.

WALL PENETRATIONS:

All ducts penetrating structural or architectural walls shall be sealed air and sound tight as specified in Section 15100, Mechanical General Requirements.

FIRE RATED SURFACE PENETRATIONS:

All ducts penetrating fire rated surfaces shall be sealed as directed in 15050-2.

VARIABLE AIR VOLUME BOXES:

Furnish and install complete the variable air volume boxes shown and specified on the plans. Boxes shall be of the pressure independent type and shall reset air volume within plus or minus 5% of required air flow (as determined by the space thermostat).

VAV box manufacturer shall provide a sheet metal enclosure for the ATC controls.

The submittal shall include a schedule showing VAV boxes and technical data in the order scheduled on the plans. Control diagrams for each box function shall be provided.

All VAV boxes have been selected for a maximum room NC of 35.

VAV units designated shall be of the size and capacities shown on the drawings. Units shall have factory catalog performance ratings which conform to C.F.M., static pressure, and noise criteria specified.

Cabinets shall be constructed of not lighter than 22 gauge, zinc-coated steel with factory-applied enamel paint finish. Internal surfaces shall be acoustically and thermally insulated with a glass fiber material surface-treated to prevent erosion and which has UL approval meeting NBFU and NFPA.

Air volume damper shall be constructed to prevent air leakage in excess of 2% of rated quantity at rated inlet static pressure.

A calibrated orifice shall be incorporated within the terminal. External differential pressure taps (separate from the control pressure taps) shall be provided for air flow measurement with a 0-1 inch gauge. Each terminal shall have a flow chart attached.

Automatic damper operators and controllers shall be furnished by the ATC contractor and installed by the VAV box manufacturer.

The VAV box manufacturer shall furnish and install an approved cross flow sensor with a gain factor of not less than three (3).

Performance of units shall be based on tests conducted in accordance with ASHRAE Standard 37-72.

VAV boxes shall be Naylor, Trane, Tuttle & Bailey or Mitco.

CROSS FLOW PRESSURE SENSORS FOR VAV BOXES:

Sensors shall be aluminum corrosion resistant of the cross flow type with ported tubes and baffle mounted to a center manifold. The center manifold shall have 1/4" barb fittings for FRPE tubing, and shall provide a differential pressure proportional to the average velocity of air moving through duct.

The sensors shall have an amplification factor (gain) of at least three and flow coefficient as follows:

Size	Cv
4	209
5	315
6	462
7	612
8	817
10	1250
12	1792
14	2474
16	3235

REGISTERS, GRILLES & DIFFUSERS:

Furnish and install complete the registers, grilles, and diffusers of the size and type shown on the drawings. All diffusers to be complete with opposed blade balancing dampers and diffusing vanes. Registers shall be complete with opposed blade balancing dampers. Large return air grilles shall be reinforced at time of installation to provide a sturdy, vibration-free installation. All grilles, registers, and diffusers shall be steel construction, unless specified differently on plans or in equipment schedule. All grilles and registers shall have "off-white" finish, unless otherwise specified.

Registers, grilles, and diffusers shall be Titus, Air Guide, Nailor, Price, Krueger, Metal-Aire, Carnes, or Tuttle & Bailey.

Coordinate all grilles, registers, and diffusers with ceiling system.

General: All surfaces behind ceiling grilles (return and exhaust) shall be painted flat black.

EXHAUST FANS:

Ceiling Type:

Furnish and install complete the ceiling-mounted exhaust fans shown and specified on the drawings.

Fan shall have acoustically insulated housing for quiet operation. Air deliveries shall be as indicated on the drawings and shall be certified by AMCA performance tests.

Fan shall have centrifugal wheel direct connected to motor. Ceiling grille shall be all aluminum construction with satin finish. Entire fan, motor, and wheel assembly shall be removable without disturbing the housing. Fan speeds shall not exceed 1100 RPM. Unit shall be complete with backdraft damper.

Fan shall be Cook, Penn, U.S. Fan, Broan, Breidert.

IN FLOOR HEATER:

Provide in floor forced air electric heater. Heater shall have a 20 gauge Powder coated steel finish with heavy duty 14 gauge grille. Heater to be complete with thermostat an automatic reset limit control.

Heater shall be Chromalox or Markel.

AIR FILTERS:

Provide one complete set of spare filter media (in addition to the new filters installed at time of acceptance) for each unit filter bank and store on site as directed by Architect.

Air filter banks shall be Cambridge, AAF or Eco-Air.

HVAC SMOKE DETECTORS:

All units above 2000 CFM shall be provided with smoke detectors located in the supply air discharge and return air intake. Detectors to be provided and wired under Section 16000.

COMBINATION FIRE AND SMOKE DAMPERS:

Furnish and install at locations shown on plans, combination fire-smoke dampers. Frame shall be minimum 16 gauge galvanized steel formed from a continuous channel section. Bearings shall be formed in the frame and shall match the contour of the blade. Blades shall be roll formed single-thickness galvanized steel and shall overlap both frame and adjacent blades a minimum of 3/4". Blade edge and jamb seals shall be low friction type non-degradable steel-to-steel and shall withstand 850N F. with a minimum leakage of 15 cfm/ft. at 1" w.g. Stainless steel flexible metal compression type jamb seals will not be accepted. The torque required to maintain the rating in the closed position shall be 0 in-lbs. Blade linkage shall be interconnected to the damper jackshaft on both ends.

Each damper shall be 1-1/2 hour rated per UL Standard 555, and shall be classified by Underwriters Laboratories as a Leakage Rated Damper for use in smoke control systems under the latest version of UL 555S. The leakage rating under UL 555S shall be no higher than leakage Class II. Dampers shall be tested in HVAC systems to ensure operation with pressures of at least 4" w.g. in the closed position, and 4000 fpm in the open position. Each damper shall carry a UL label (File No. R11767) and a CSFM label (File No. 3225-368:008).

Actuators shall open upon loss of power and shall be rated to an elevated temperature of 250N F. Actuators shall be factory installed and shall be 120 volt electric and shall provide a minimum of 75 in-lbs. of torque at the damper shaft. Damper leakage shall provide for fail closed fire operation independent of the actuator position. Actuator bracket shall be designed to allow for the installation of ductmate without realignment or alterations. Manufacturer shall provide a factory assembled sleeve of 16 gage galvanized steel standard. Damper and actuator assembly shall be factory cycled to ensure proper operation. Dampers shall be installed in accordance with manufacturer's installation instructions. Suitable access shall be provided for inspection and servicing of each damper.

Electro-thermal Bi-Metallic Link (resettable) - Each damper assembly shall be equipped with a UL 33 listed electro-thermal bi-metallic resettable 'McCabe Link' that provided for fail closed fire and smoke operation independent of the actuator position, electric sensing stats will not be accepted. Electro-thermal McCabe link shall disengage damper linkage from actuator and mechanically lock damper in a closed position from either a smoke detector signal or when duct temperature exceeds 250N F. (shall not exceed operational limit of actuator). The design shall only allow damper to be reopened when the smoke detector signal is clear and the duct temperature has returned to a safe level, as per NFPA 92A. Damper assembly shall include dual position indicator switch package capable of positively indicating each damper's status as being full-open or full-closed at remote central control panel. Actuator shall fail open upon loss of power.

Dampers shall be Pottorff Model 5010 with PI-50 dual position indicating switch package.

DAMPERS - GENERAL:

Damper frames shall be of not less than 13 gauge galvanized steel, formed for extra strength, with mounting holes for enclosed duct mounting.

All damper blades shall be of not less than 16 gauge galvanized steel formed for strength and high velocity performance. Blades on all dampers must be of not over 6" in width. Blades shall be secured to 1/2" diameter zinc-plated axles by zinc-plated bolts and nuts. All blade bearings shall be nylon. Blade side edges shall seal off against spring stainless steel seals. Teflon-coated thrust bearings shall be provided at each end of every blade to minimize torque requirements and insure smooth operation. All blades linkage hardware shall be construction of corrosion-resistant, zinc-plated steel and brass.

Dampers shall be manufactured by United, Louvers & Dampers, or Daniel Mfg.

AUTOMATIC DAMPERS:

The ATC contractor shall furnish all automatic control dampers. The sheet metal contractor shall install all dampers and transition all ductwork to the dampers. Frames shall be of 13 gauge and blades double 22 gauge galvanized sheet steel. Dampers shall have leakage of 1/2% (based on 2000 FPM approach velocity and 4" W.B. pressure). Dampers shall be selected to precisely control the flow of air in the fresh, return, relief, and exhaust systems.

All modulating dampers to be of opposed blade type. Maximum blade width not to exceed 6 inches.

Dampers shall be similar to Ruskin model CD-50.

Dampers of other manufacture may be approved provided construction, leakage characteristics, etc., are equal to the specified dampers specified above. Cesco, C & S, Safe-Air, NCA, United, C & S, Air Balance, or Pottoroff.

PART 3 - EXECUTION

SURFACE CONDITIONS:

Inspection:

Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Verify that the work of this section may be installed in accordance with all pertinent codes and regulations in the approved shop drawings.

Discrepancies:

In the event of discrepancies, immediately notify the Owner.

Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

Should the contractor proceed with the work without so resolving the discrepancy, he does so on his own responsibility.

INSTALLATION OF EQUIPMENT:

General:

Install all equipment where indicated on the drawings, allowing adequate space for service to all equipment items.

Avoid interference with structure an the work of other trades. Do not cut into load carrying members without the approval of the Owner.

INSTALLATION OF DUCTS:

General:

Install all equipment where indicated on the drawings, allowing adequate space for service to all equipment items.

Avoid interference with structure and the work of other trades. Do not cut into load carrying members without the approval of the Owner.

All necessary allowance and provisions shall be made in the installation of sheet metal ducts for the structural conditions of the building, and ducts shall be transformed or divided, as may be required. Whenever this is necessary, the required area shall be maintained. All changes, however, must be approved and installed as directed.

During the installation, the open ends of all ducts shall be protected by covering with plastic sheet tied in place to prevent debris and dirt from entering.

Install this work in cooperation with other trades so that there will be no delay in progress of construction work. It is extremely important that the duct system be clean before final connections are made.

Hanger and Supports:

Hangers for ducts up to 18" in width shall be placed on not more than 8'-0" centers. Ducts 19" and over in width shall be supported on not more than 4'-0" centers. Hangers shall be placed plumb and present a neat appearance. Construct hangers from galvanized band iron 1" x 1/8" for duct up to 36" wide. Hangers shall extend down the sides of the ducts not less than 9". On ducts less than 9" in depth, hangers shall extend the full depth of the ducts. Attach hangers to ducts using not less than three rivets or Parker screws of appropriate sizes. It is essential that all ducts be rigidly supported. Where vertical ducts pass thru floors or roofs, supporting angles shall be galvanized and of sufficient size to support the ductwork rigidly. Place supporting angles on at least two sides of the duct. For round ducts, strap hangers shall extend completely around ducts.

Ducts at Masonry:

Where ducts are shown connecting to masonry openings and along edges of all plenums at floors and walls, provide a continuous 2" x 2" x 3/8" galvanized angle iron which shall be bolted to the construction and made airtight to the same by applying fire-rated insulation and caulking compound.

Sheet metal at these locations shall be bolted to the angle irons.

The annular space around the ducts shall be packed with fire safing insulation and caulked or sealed, as required, to maintain the fire-rated integrity of the wall.

CLEANING OF DUCTS:

Before the ceiling is installed and final connections are made to the outlets, it will be required that all fans be operated at full capacity to blow out dirt and debris from ducts.

APPROVED MANUFACTURERS' PRODUCTS:

The following manufacturers, trade-names, and products are approved provided that they satisfy every requirement of the Drawings, Specifications, and all Addenda, and conform to the design, intent, and the quality, and standards specified.

Naming of an "approved manufacturer" does not mean that the manufacturer or product automatically complies with the design documents. Submittals must be acceptable in all respects to the project design team.

PRODUCT	MANUFACTURER
VAV Boxes	Krueger, Titus
Electric Wall Heaters	Qmark, Redd-I
Manual Volume Dampers	Pottorff,
High Efficiency Dampers	Clifco
Spin Ins	Clifco
Flex	Hart & Cooley, ANCO Products
Ceiling Exhaust Fans	Greenheck, ACME
Fire/Smoke Dampers	Greenheck, Air Balance

SECTION 15900 -AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL

GENERAL CONDITIONS:

The General Conditions, Supplementary Conditions, alternates and addenda, applicable drawings and the technical specifications shall all apply to all work under this division.

1.1 SCOPE OF WORK:

A. The Facility Management and Control System (FMCS) Contractor shall furnish and install a fully integrated building automation system, incorporating direct digital control (DDC) for energy management, equipment monitoring and control as herein specified. The system shall include all required computer software and hardware, controllers, sensors, transmission equipment, system workstations, local panels, conduit, wire, installation, engineering, database and setup, supervision, commissioning, acceptance test, training, warranty service and, at the owner's option, extended warranty service.

B. The system shall use LonTalk® as its native protocol. All system DDC controllers furnished by this contractor shall communicate on the LON communication network only. This includes all primary equipment controllers, VAV or terminal unit controllers and all other peripheral equipment controllers.

System components shall be certified by LONMARK® and display the LONMARK® logo where applicable. System components that do not have a LONMARK® profile shall be compatible with the LONMARK® standards. For each LonWorks device that does not have LonMark certification, the device supplier must provide DRF and XIF files for the device.

C. The FMCS shall be capable of complete integration of the facility infrastructure systems with user access to all system data either locally over a secure Intranet within the building or by remote access by a standard Web Browser over the Internet.

D. The FMCS shall communicate to third party systems such as chillers, air handling systems, energy metering systems, other energy management systems, access control systems, fire-life safety systems and other building management related devices with open, interoperable communication capabilities.

E. The new controls shall communicate to the FMCS in the existing facility and be capable of seamlessly integrating all functionality of the existing facility in the open protocol LON FMCS. Software, graphics, alarms and schedule shall be consistent with the existing facility

F. All materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed specially for this project.

G. The FMCS shall be Staefa Talon as installed by Atkinson Electronics Inc. as an extension of the existing BMS.

1. 2 RELATED WORK SPECIFIED ELSEWHERE:

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

B. Products furnished but not installed under this section:

1. Valves, flow switches, flow sensors, thermowells and pressure taps to be installed under section 15000.
2. Automatic dampers not provided with equipment to be provided by 15900 and installed under section 15800.

C. Coordination with electrical:

1. Installation of all line voltage power wiring by division 16.
2. Each motor starter provided under Division 16, shall be furnished with individual control power transformer to supply 120-volt control power and auxiliary contacts (one N.O. and one N.C.) for use by this section.

1.3 QUALITY ASSURANCE:

A. The system shall be furnished, engineered, and installed by the manufacturers' locally authorized representative. The controls contractor shall have factory-trained technicians to provide instruction, routine maintenance, and emergency service within 24 hours upon receipt of request.

B. At the time of bid, all FMCS Application Specific Controllers and Programmable Equipment Controllers shall be listed as follows:

1. American Society for testing and materials, ASTM
2. Institute of Electrical and Electronic Engineers, IEEE
3. National Electrical Manufacturers Association, NEMA
4. Underwriters Laboratory, UL 916
5. FCC Regulation, Part 15, Section 156
6. National Fire Protection Association, NFPA
7. Local building codes

C. The Manufacturer of the FMCS digital controllers shall provide documentation supporting compliance with ISO-9001 (Model for Quality Assurance in Design/Development, Production, Installation and Servicing). Product literature provided by the FMCS digital controller manufacturer shall contain the ISO-9001 Certification Mark from the applicable registrar.

1. 4 SUBMITTALS:

A. Submit 6 complete sets of documentation in the following phased delivery schedule:
   1. Valve and damper schedules
   2. Equipment data cut sheets
   3. System schematics, including:
      a. sequence of operations
      b. point names
      c. point addresses
      d. point to point wiring
      e. interface wiring diagrams
      f. panel layouts
      g. system riser diagrams
   4. AutoCAD compatible drawings

B. Upon project completion, submit operation and maintenance manuals, consisting of the following:
   1. Index sheet, listing contents in alphabetical order
   2. Manufacturer's equipment parts list of all functional components of the system, disk of system schematics, including wiring diagrams
   3. Description of sequence of operations
   4. As-Built interconnection wiring diagrams
   5. User's documentation containing product, system architectural and programming information.
   6. Trunk cable schematic showing remote electronic panel locations, and all trunk data
   7. List of connected data points, including panels to which they are connected and input device (ionization detector, sensors, etc.)
   8. Conduit routing diagrams
   9. Copy of the warranty
   10. Operating and maintenance cautions and instructions
   11. Recommended spare parts list

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Staefa Control System as installed by Atkinson Electronics, Inc.

2.2 The Facility Management Control System (FMCS) shall be comprised of a network of interoperable, stand-alone digital controllers. The FMCS shall incorporate LonWorks™ technology using Free Topology Transceivers (FTT-10), and specific conformance to the LONMARK™ Interoperability Association's v3.0 Physical Layer guidelines in all unitary, terminal and other device controllers. The system shall include:

A. Network Area Controllers (NAC's) for distributed system applications, databases and networking functions.

B. Programmable Equipment Controllers (PEC's) for control of primary mechanical systems and distributed system applications. Controllers shall be fully programmable to create custom control solutions.

C. Application Specific Controllers (ASC's) for control of terminal equipment.

D. Graphical User Interface (GUI), which includes the hardware and software necessary for a user to interface with the control system and devices.

2.3 The physical network shall use polarity insensitive twisted pair wiring and support star, home run, multi-drop, loop, or a mixture of these wiring topologies. The network shall communicate at a minimum 78Kbps.

2.4 All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not be acceptable.

2.5 Communication and integration of 3rd party LONMARK® products shall be accomplished without gateways or interface devices. The 3rd party product supplier shall provide DRF and XIF files for each device.

2.6 Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

2.7 NETWORK AREA CONTROLLER (NAC):

A. The Network Area Controller (NAC) shall provide the interface between the field control devices, and provide global supervisory control functions over the control devices connected to the NAC. It shall be capable of executing application control programs to provide:

1. Calendar functions

2. Scheduling
3. Trending
4. Alarm monitoring and routing
5. Time synchronization
6. Integration of LonWorks controller data
7. Network Management functions for all LonWorks based devices

B. The NAC shall provide multiple, concurrent user access to the system and support for ODBC or SQL. A database resident on the NAC shall be an ODBC-compliant database or must provide an ODBC data access mechanism to read and write data stored within it.

C. The NAC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.

D. The NAC shall provide alarm recognition, storage; routing, management, and analysis to supplement distributed capabilities of equipment or application specific controllers.

1. The NAC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.
2. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but limited to:
   a. To alarm
   b. Return to normal
   c. To fault
3. Provide for the creation of an unlimited number of alarm classes for the purpose of routing types and or classes of alarms, i.e.: security, HVAC, Fire, etc.
4. Provide timed (schedule) routing of alarms by class, object, group, or node.
5. Provide alarm generation from binary object "runtime" and /or event counts for equipment maintenance. The user shall be able to reset runtime or event count values with appropriate password control.

E. Alarms shall be annunciated in any of the following manners as user defined:

1. Screen message text
2. Email of the complete alarm message to multiple recipients. Provide the ability to route and email alarms based on:
   a. Day of week
   b. Time of day
   c. Recipient
3. Pagers via paging services that initiate a page on receipt of email message
4. Graphic with flashing alarm object(s)
5. Printed message, routed directly to a dedicated alarm printer

F. The following shall be recorded by the NAC for each alarm (at a minimum):

1. Time and date
2. Location (building, floor, zone, office number, etc.)
3. Equipment (air handler #, accessway, etc.)
4. Acknowledge time, date, and user who issued acknowledgement.
5. Number of occurrences since last acknowledgement.

G. Defined users shall be given proper access to acknowledge any alarm, or specific types or classes of alarms defined by the user.

H. A log of all alarms shall be maintained by the NAC and/or a server (if configured in the system) and shall be available for review by the user.

I. Provide a "query" feature to allow review of specific alarms by user defined parameters.

J. A separate log for system alerts (controller failures, network failures, etc.) shall be provided and available for review by the user.

K. An Error Log to record invalid property changes or commands shall be provided and available for review by the user.

L. Data Collection and Storage

1. The NAC shall have the ability to collect data for any property of any object and store this data for future use.
2. The data collection shall be performed by log objects, resident in the NAC that shall have, at a minimum, the following configurable properties:
   a. Designating the log as interval or deviation.
   b. For interval logs, the object shall be configured for time of day, day of week and the sample collection interval.
   c. For deviation logs, the object shall be configured for the deviation of a variable to a fixed value. This value, when reached, will initiate logging of the object.
   d. For all logs, provide the ability to set the maximum number of data stores for the log and to set whether the log will stop collecting when full, or rollover the data on a first-in, first-out basis.
   e. Each log shall have the ability to have its data cleared on a time-based event or by a user-defined event or action.
3. All log data shall be stored in a relational database in the NAC and the data shall be accessed from a server (if the system is so configured) or a standard Web Browser.
4. All log data, when accessed from a server, shall be capable of being manipulated using standard SQL statements.
5. All log data shall be available to the user in the following data formats:
   a. HTML
   b. XML

c. Plain Text
d. Comma or tab separated values

6. Systems that do not provide log data in HTML and XML formats at a minimum shall not be acceptable.
7. The NAC shall have the ability to archive its log data either locally (to itself), or remotely to a server or other NAC on the network. Provide the ability to configure the following archiving properties, at a minimum:
   a. Archive on time of day
   b. Archive on user-defined number of data stores in the buffer (size)
   c. Archive when buffer has reached it's user-defined capacity

M. Provide and maintain an Audit Log that tracks all activities performed on the NAC. Provide the ability to specify a buffer size for the log and the ability to archive log based on time or when the log has reached its user-defined buffer size. Provide the ability to archive the log locally (to the NAC), to another NAC on the network, or to a server. For each log entry, provide the following data:

1. Time and date
2. User ID
3. Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.

N. The NAC shall have the ability to automatically backup its database. The database shall be backed up based on a user-defined time interval.

1. Copies of the current database and, at the most recently saved database shall be stored in the NAC. The age of the most recently saved database is dependent on the user-defined database save interval.
2. The NAC database shall be stored, at a minimum, in XML format to allow for user viewing and editing, if desired. Other formats are acceptable as well, as long as XML format is supported.

2.8 PROGRAMMABLE EQUIPMENT CONTROLLERS (PEC):

A. Programmable Equipment Controllers (PEC's) shall be stand-alone, multi-tasking, real-time digital control processors with an embedded network database.

B. The PEC's shall communicate via native LonTalk protocol and be compatible with the LONMARK® standards. Provide a minimum of 4MB Random Access Memory in each PEC.

C. The PEC must communicate peer-to-peer with the all of the network application specific and programmable controllers sharing alarming, trending, scheduling and totalization information.

D. PEC's that do not reside exclusively on the LonTalk network and/or cannot provide direct distribution of the system level applications must be configured to co-function with an additional operational back-up PEC.

E. Programming of the PEC shall be accomplished by using graphical software that incorporates drag and drop capabilities. The PEC software database must be able to execute all of the specified mechanical system controls functions. The programming software shall be able to bundle software logic to simplify control sequencing. All values, which make up the PID output value, shall be readable and modifiable at a workstation or portable service tool. Each input, output, or calculation result shall be capable of being shared/bound with any controller or interface device on the network.

F. PEC's shall be able to execute custom, job-specific processes defined by the user, to automatically perform calculations and special control routines.

1. A single process shall be able to incorporate measured or calculated data from any and all other PEC's on the network. In addition, a single process shall be able to issue commands to points in any and all other PEC's on the network.
2. Processes shall be able to generate operator messages and advisories to operator I/O devices.

G. Each PEC shall support firmware upgrades without the need to replace hardware. The upgrades can be accomplished remotely over the LonTalk network and/or by visiting each controller.

H. Each PEC shall continuously perform self-diagnostics, which include communication diagnosis and diagnosis of all components. The PEC shall provide both local and remote annunciation of any detected component failures, low battery conditions or repeated failure to establish communication.

I. In the event of the loss of normal power, there shall be an orderly shutdown of all PEC's to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 72 hours.

1. Upon restoration of normal power, the PEC shall automatically resume full operation without manual intervention.
2. All PEC's control programming and databases must be stored in Flash memory, therefore eliminating data loss, downtime and re-load time.

J. Provide a separate PEC for each AHU or other HVAC system. All system points shall reside on a single controller.

K. Historical data collection utilities shall be provided to manually or automatically sample and store system data for selected points. Any point, physical or calculated may be designated for trending. Any point, regardless of physical location in the network, may be collected and stored. Two methods of collection shall be allowed either by a

pre-defined time interval or upon a pre-defined change of value. Sample intervals of 1 minute to 7 days shall be provided. The PEC shall have a dedicated RAM-based buffer for trend data. All trend data shall be available for transfer to a Workstation without manual intervention.

2.9 APPLICATION SPECIFIC CONTROLLERS (ASC):

A. Each Application Specific Controller (ASC) shall operate as a stand-alone LonMark® compliant controller capable of performing its specified control responsibilities independent of other controllers in the network. Each ASC shall be a minimum 16-BIT microprocessor based, multi-tasking, multi-user, real time digital control processor.

B. Each ASC's application must comply with LONMARK® interoperability profile guidelines.

C. Flash memory reload or updating of an existing control algorithm shall be completed over the network.

D. Network access shall be accomplished at the ASC room sensor or the ASC. System node access shall be available from connecting to the room sensor jack. Systems that do not have a system access jack from the room sensor shall provide a dedicated network jack next to each room sensor.

E. Controllers shall include all inputs and outputs necessary to perform the specified control sequences. Analog and digital outputs shall be industry standard signals such as 0-10V and 3-point floating control allowing for interface to a variety of industry standard modulating actuators. The ASC inputs and outputs shall consist of industry standards types. Inputs shall be electrically isolated from outputs, communications and power. All inputs shall be provided with an auto-calibrate function to eliminate sensing errors.

F. All controller sequences and operation shall provide closed loop control of the intended application. Closing control loops over the network is not acceptable.

G. The ASC must be mounted remotely from the room sensor. ASC's, that are wall mounted with integral room sensors, are not acceptable.

H. The control program shall reside in the ASC. The application program configuration information shall be stored in non-volatile memory with no battery back up.

I. After a power failure the ASC must run the control application using the current setpoints and configuration. Reverting to default or factory setpoints are not acceptable.

2.10 GRAPHICAL USER INTERFACE SOFTWARE (GUI):

A. Operator workstations must be capable of supporting any LonMark® compliant product. The operator shall not be able to distinguish the DDC points from different manufacturers when commanding, monitoring points or acknowledging alarms.

B. The software shall provide a multi-tasking type environment that allows the user to run several applications simultaneously. The GUI software shall run on a Windows 2000 or NT 32-bit operating system. The operator shall be able to work in Microsoft Word, Excel, and other Windows based software packages, while concurrently annunciating on-line FMCS alarms and monitoring information. If the software is unable to display several different types of displays at the same time, the FMCS contractor shall provide at least two operator workstations at each location specified.

C. Real-Time Displays. The GUI, shall at a minimum, support the following graphical features and functions:

1. Graphic screens shall be developed using any drawing package capable of generating a GIF, BMP, or JPG file format. Use of proprietary graphic file formats shall not be acceptable. In addition to, or in lieu of a graphic background, the GUI shall support the use of scanned pictures.

2. A gallery of HVAC and automation symbols shall be provided including fans, valves, motors, chillers, AHU systems, standard ductwork diagrams and symbols. The user shall have the ability to add custom symbols to the gallery as required.

3. Graphic screens shall have the capability to contain objects for text, real-time values, animation, color spectrum objects, logs, graphs, HTML or XML document links, schedule objects, hyperlinks to other URL's, and links to other graphic screens.

4. Graphics shall support layering and each graphic object shall be configurable for assignment to a layer. A minimum of six layers shall be supported.

5. Modifying common application objects, such as schedules, calendars, and set points shall be accomplished in a graphical manner.

   a. Schedule times will be adjusted using a graphical slider, without requiring any keyboard entry from the operator.

   b. Holidays shall be set by using a graphical calendar, without requiring any keyboard entry from the operator.

6. Commands to start and stop binary objects shall be done by mouse command from the pop-up menu. No entry of text shall be required.

7. Adjustments to analog objects, such as set points, shall be done by mouse command using a graphical slider to adjust the value. No entry of text shall be required.

D. System Configuration. At a minimum, the GUI shall permit the operator to perform the following tasks, with proper password access:

1. Create, delete or modify control strategies.
2. Add/delete objects to the system.
3. Tune control loops through the adjustment of control loop parameters.
4. Enable or disable control strategies.
5. Generate hard copy records or control strategies on a printer.
6. Select points to be alarmable and define the alarm state.
7. Select points to be trended over a period of time and initiate the recording of values automatically.

E. On-Line Help. Provide a context sensitive, on-line help system to assist the operator in operation and editing of the system. On-line help shall be available for all applications and shall provide the relevant data for that particular screen. Additional help information shall be available through the use of hypertext. All system documentation and help files shall be in HTML format.

F. Each operator shall be required to log on to that system with a user name and password in order to view, edit, add, or delete data. System security shall be selectable for each operator. The system administrator shall have the ability to set passwords and security levels for all other operators. Each operator password shall be able to restrict the operators' access for viewing and/or changing each system application, full screen editor, and object. Each operator shall automatically be logged off of the system if no keyboard or mouse activity is detected. This auto log-off time shall be set per operator password. All system security data shall be stored in an encrypted format.

G. System Diagnostics. The system shall automatically monitor the operation of all workstations, printers, modems, network connections, building management panels, and controllers. The failure of any device shall be annunciated to the operator.

H. The system will be provided with a dedicated alarm window or console. This window will notify the operator of an alarm condition, and allow the operator to view details of the alarm and acknowledge the alarm. The use of the Alarm Console can be enabled or disabled by the system administrator.

1. When the Alarm Console is enabled, a separate alarm notification window will supercede all other windows on the desktop and shall not be capable of being minimized or closed by the operator. This window will notify the operator of new alarms and un-acknowledged alarms. Alarm notification windows or banners that can be minimized or closed by the operator shall not be acceptable.

2.11 WEB BROWSER CLIENTS:

A. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer™ or Netscape Navigator™. Systems

requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.

B. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Web page access and control shall be from system Network Area Controllers, not from the Workstation. This prevents the problem of no access to Web pages if the Workstation is turned off.

C. The Web browser shall provide the same view of the system, in terms of graphics, schedules, calendars, logs, etc., and provide the same interface methodology as is provided by the Graphical User Interface. Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted. The browser shall include background refresh software to all real-time updates without use of a refresh button. No additional software shall be required at the remote Internet location other than a standard web browser.

D. The Web browser client shall support at a minimum, the following functions:

1. User log-on identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.

2. Graphical screens developed for the GUI shall be the same screens used for the Web browser client. Any animated graphical objects supported by the GUI shall be supported by the Web browser interface.

3. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.

4. Storage of the graphical screens shall be in the Network Area Controller (NAC), without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.

5. Real-time values displayed on a Web page shall update automatically without requiring a manual "refresh" of the Web page.

6. User's shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:

   a. Modify common application objects, such as schedules, calendars, and set points in a graphical manner. Schedule times will be adjusted using a graphical slider, without requiring any keyboard entry from the operator. Holidays shall be set by using a graphical calendar, without requiring any keyboard entry from the operator.

   b. Commands to start and stop binary objects shall be done by right-clicking the selected object and selecting the appropriate command

from the pop-up menu. No entry of text shall be required.

c. View logs and charts

d. View and acknowledge alarms

7. The system shall provide the capability to specify a user's (as determined by the log-on user identification) home page. Provide the ability to limit a specific user to just their defined home page. From the home page, links to other views, or pages in the system shall be possible, if allowed by the system administrator.

8. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

2.12 LonWorks NETWORK MANAGEMENT:

A. The Graphical User Interface software (GUI) shall provide a complete set of integrated LonWorks network management tools for working with LonWorks networks. These tools shall manage a database for all LonWorks devices by type and revision, and shall provide a software mechanism for identifying each device on the network. These tools shall also be capable of defining network data connections between LonWorks devices, known as "binding". Systems requiring the use of third party LonWorks network management tools shall not be accepted.

B. Network management shall include the following services: device identification, device installation, device configuration, device diagnostics, device maintenance and network variable binding.

C. The Network configuration tool shall also provide diagnostics to identify devices on the network, to reset devices, and to view health and status counters within devices.

D. These tools shall provide the ability to "learn" an existing LonWorks network, regardless of what network management tool(s) were used to install the existing network, so that existing LonWorks devices and newly added devices are part of a single network management database.

E. The network management database shall be resident in the Network Area Controller (NAC), ensuring that anyone with proper authorization has access to the network management database at all times. Systems employing network management databases that are not resident, at all times, within the control system shall not be accepted.

2.13 FIELD DEVICES:

A. Provide automatic control valves, automatic control dampers, thermostats, clocks, sensors, controllers, and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard control system

components as indicated by published product information, designed and constructed as recommended by manufacturer.

B. TEMPERATURE SENSORS

1. Temperature Sensors: Temperature sensors shall be linear precision elements with ranges appropriate for each specific application. All ASC room sensors shall provide for direct connection and access to the LonTalk network. Sensors that provide access only to their connected controller shall not be acceptable"

2. Digital room sensors shall have day / night override button, and set point slide adjustment override options. The set point slide adjustment shall have software limits by the automation system to limit the amount of temperature setpoint adjustment.

3. Duct mounted averaging sensors shall utilize a sensing element incorporated in a copper capillary with a minimum length of 20 feet. The sensor shall be installed according to manufacture recommendation and looped and fastened at a minimum of every 36 inches.

4. Sunshields shall be provided for outside air sensors.

5. Thermo-wells for all immersion sensors shall be stainless steel or brass as required for the application.

C. Humidity Sensors: N/A

D. Air Velocity Sensors: The sensor shall use differential pressure to determine airflow rate and have repeatability within 1% of reading and an accuracy of ± 5% of range. The velocity range shall be from 0 to 3250 FPM.

E. Pressure Sensors: The differential pressure sensor shall be temperature compensated and shall vary the output voltage with a change in differential pressure. Sensing range shall be suitable for the application with linearity of 1.5% of full scale and offset of less than 1% of full scale. Sensor shall be capable of withstanding up to 150% of rated pressure without damage.

F. Air Quality Sensor: The air quality sensor shall be capable of simultaneously monitoring various types of Volatile Organic Compounds (VOCs). The sensor shall be capable of monitoring from 100% air quality to 0% air quality and shall produce a linear 0-10 VDC signal. The Air Quality Sensor shall be provided in wall or duct mounted models, as shown on the plans.

G. Occupancy Sensor: N/A

H. Switches and Thermostats

1. The FMCS Contractor shall furnish all electric relays and coordinate with the supplier of magnetic starters for auxiliary contact requirements. All electric control devices shall be of a type to meet current, voltage, and switching requirement of their particular application. Relays shall be provided with 24 VAC coils and contacts shall be rated at 10 amps minimum.

2. Duct Smoke Detectors: Duct smoke detectors shall be supplied by others with an integral auxiliary contact to be used by the FMCS contractor to provide a digital input to the FMCS.

3. Low Temperature Detection Thermostats: Shall be the manual reset type. The thermostat shall operate in response to the coldest one-foot length of the 20-foot sensing element, regardless of the temperatures at other parts of the element. The element shall be properly supported to cover the entire downstream side of the coil with a minimum of three loops. Separate thermostats shall be provided for each 25 square feet of coil face area or fraction thereof.

4. Differential Pressure Switches: Pressure differential switches shall have SPDT changeover contact, switching at an adjustable differential pressure setpoint.

5. Current Sensing Relays: Motor status indications, where shown on the plans, shall be provided via current sensing relays. The switch output contact shall be rated for 30 VDC, .15 amps.

6. Flow Switches: Motor status indications, where shown on the plans, shall be provided via flow switches. Flow switches shall be of the paddle type equipped with SPDT contacts to establish proof of flow.

7. Firestats: N/A

I. Control Valves

1. General: Control Valves up to 4 inches shall be sized for a 3 to 5 psi pressure drop. Valves shall be packless, modulating, electrically or magnetically actuated, with a control rangeability of 100 to 1. These valves shall have true linear flow characteristics in relationship to valve opening.

2. ½ inch to 4 inch: Valves shall be equipped with handwheel, or manual position mounted dial adjacent to valve, to allow manual positioning of valve in absence of control power. (Valves with a rangeability of less than

200 to 1 shall utilize two valves in a 1/3 - 2/3 parallel arrangement in order to achieve control rangeability).

3. 4 inches to 6 inches: Valves shall be modulating electrically actuated, 2-way or 3-way as required, with a rangeability of 50 to 1. Valve body shall be flanged and shall be equipped with a handwheel, or manual position dial mounted adjacent to the valve, to allow manual positioning of the valve in the absence of control power.

4. Butterfly Valves: 2-way and 3-way butterfly valves shall be cast iron valve body, with stainless steel stem, and available with disc seal for bubble-tight shut off.

J. Damper Actuators

1. Actuators shall be of the push-pull or rotary type of modulating, 3-point floating, or 2-position control as required by the application. The actuator shall use an overload-proof synchronous motor or an electric motor with end switches to de-energize the motor at the end of the stroke limits. Control voltage shall be 24VAC, 0-20VDC, or 4-20ma as required. Actuators shall be available with spring return to the normal position when required. Actuators shall have a position indicator for external indication of damper position. Actuators shall have manual override capability without disconnecting damper linkage.

K. Control Dampers

1. Motorized dampers, unless otherwise specified elsewhere, shall have damper frames using 13 gauge galvanized steel channel or 1/8" extruded aluminum with reinforced corner bracing. Damper blades shall not exceed ten (10) inches in width or 48" in length. Blades are to be suitable for high velocity performance. Damper bearings shall be as recommended by manufacturer for application. Bushings that turn in the bearing are to be oil impregnated sintered metal. All blade edges and top and bottom of the frame shall be provided with replaceable, butyl rubber or neoprene seals. Side seals may be spring-loaded stainless steel. The seals shall provide a maximum of 1% leakage at a wide open face velocity of 1500 FPM and 4: W.C. close-off pressure. The damper linkage shall provide a linear flow or equal percentage characteristic as required.

2. Control dampers shall be parallel or opposed blade type as scheduled on drawings or outdoor and return air mixing box dampers shall be parallel blade, arranged to direct air streams towards each other. All other dampers may be parallel or opposed blade types.

PART 3 - EXECUTION

3.1 PROJECT MANAGEMENT:

A. Provide a project manager who shall, as a part of his duties, be responsible for the following activities:

1. Coordination between this Contractor and all other trades, owner, local authorities and the design team.

2. Scheduling of manpower, material delivery, equipment installation and checkout.

3. Maintenance of construction records such as project scheduling and manpower planning and AutoCAD for project co-ordination and as-built drawings.

4. Coordination/Single point of contact

3.2 INSTALLATION METHODS:

A Install systems and materials in accordance with manufacturer's instructions, rough-in drawings and equipment details. Install electrical components and use electrical products complying with requirements of applicable Division-16 sections of these specifications.

B. The term "control wiring" is defined to include providing of wire, conduit, and miscellaneous materials as required for mounting and connecting electric or electronic control devices.

C. All wiring, low and line voltage subject shall be run in conduit (minimum ¾"). Line and low voltage wiring shall be run in separate conduits. Concealed but accessible wiring, except in mechanical rooms and areas where other conduit and piping are exposed shall run in UL plenum rated cable as approved by local codes unless expressly restricted by requirements in Division 16 specification.

D. All Controllers, Relays, Transducers, etc., required for stand-alone control shall be housed in a NEMA 1 enclosure with a lockable door.

3.3 SYSTEM ACCEPTANCE:

A. General: The system installation shall be complete and tested for proper operation prior to acceptance testing for the Owner's authorized representative. A letter shall be submitted to the Architect requesting system acceptance. This letter shall certify all controls are installed and the software programs have been completely exercised for proper equipment operation. Acceptance testing will commence at a mutually

agreeable time within ten (10) calendar days of request. When the field test procedures have been demonstrated to the Owner's representative, the system will be accepted. The warranty period will start at this time.

B. Field Equipment Test Procedures: DDC control panels shall be demonstrated via a functional end-to-end test. Such that:

1. All output channels shall be commanded (on/off, stop/start, adjust, etc.) and their operation verified.

2. All analog input channels shall be verified for proper operation.

3. All digital input channels shall be verified by changing the state of the field device and observing the appropriate change of displayed value.

4. If a point should fail testing, perform necessary repair action and retest failed point and all interlocked points.

5. Automatic control operation shall be verified by introducing an error into the system and observing the proper corrective system response.

6. Selected time and setpoint schedules shall be verified by changing the schedule and observing the correct response on the controlled outputs.

C. As-Built Documentation: After a successful acceptance demonstration, the Contractor shall submit as-built drawings of the completed project for final approval. After receiving final approval, supply "6" complete 11x17 as-built drawing sets, together with AutoCAD diskettes to the owner.

D. Operation and Maintenance Manuals: Submit four copies of operation and maintenance manuals. Include the following

1. Manufacturer's catalog data and specifications on sensors, transmitters, controllers, control valves, damper actuators, gauges, indicators, terminals, and any miscellaneous components used in the system.

2. A copy of the warranty.

3. Operating and maintenance cautions and instructions.

3.4 TRAINING:

A. Contractor shall provide to the engineer a training class outline prior to any scheduled training.

B. Factory trained control engineers and technicians shall provide training sessions for the Owner's personnel.

C. The control contractor shall conduct one (1) two-hour training courses for the designated owner's personnel in the maintenance and operation of the control system. One class shall be given upon system acceptance and the other approximately six months into the warranty.

D. The course shall include instruction on specific systems and instructions for operating the installed system to include as a minimum:

1. HVAC system overview.
2. Operation of Control System
3. Function of each Component
4. System Operating Procedures
5. Programming Procedures
7. Maintenance Procedures
8. Lighting control and interface system

3.5 WARRANTY:

A. The control system shall be warranted to be free from defects in both material and workmanship for a period of one (1) year of normal use and service. This warranty shall become effective the date the owner accepts or receives beneficial use of the system.

PART 4 - SEQUENCE OF OPERATION

4.1 AHU-1 VAV AIR HANDLER CONTROL:

A. The central air handler shall be stopped and started by the central control unit when the conference room override is enabled. The AHU shall control in a normal, occupied mode throughout the period when the room is occupied.

4.2 CONFERENCE ROOM CONTROL - FOUR PIPE FAN COIL UNIT WITH MINIMUM AIR:

A. The conference room shall be served by two fancoil units with individual room temperature sensors and independent controls. The FMCS shall be capable of coupling the control of the two units or independent control as determined by the FMCS operator.

B. Occupied/Unoccupied/Warm-up mode, shall be determined by the central control unit. or an override on the room temperature sensor. When the override is enabled outside of normal occupied hours, the room shall be in the occupied mode for a predetermined time period (typically two hours) adjustable in the FMCS. When the fan coil unit is indexed to the occupied mode, the supply fan shall run continuously subject to an ionization detector located in the return air if unit exceeds 2000 CFM. The fresh air damper on the unit shall open in the occupied mode.

C. A control loop sensing the space temperature shall reset the discharge temperature setpoint from the space temperature. When the space temperature is above the cooling setpoint, the space temperature shall reset the discharge air temperature setpoint from 50° to the space heating temperature setpoint (programmable). If the space temperature is below the heating temperature setpoint, the space temperature control loop shall reset the discharge air temperature from 110° (programmable) to the space cooling temperature setpoint. A discharge air temperature control loop shall modulate the heating valve open on a call for heat. On a call for cooling the discharge air control loop shall enable the chilled water circulating pump and modulate chilled water valve in sequence to maintain the discharge air temperature setpoint. Note: all valves shall be 3-way.

D. In the warm-up mode, the fresh air damper shall close, the unit shall cycle to maintain the space temperature heating setpoint until indexed to the occupied mode, at which time the fresh air damper shall open.

E. In the unoccupied mode, the fan shall be off and the fresh air damper closed. On a call for heating or cooling, if the space temperature varies from the unoccupied setpoint, the fan shall cycle with the coil valve open 100% to satisfy the unoccupied setting.

4.3 VAV REHEAT BOXES:

A. The occupied/unoccupied mode shall be determined by the central control unit or the push button override on the thermostat. Occupied mode: The local microprocessor control shall modulate the damper to maintain the minimum ventilation setting, if no heating or cooling is required in the space. If space temperature is greater than the cooling temperature setpoint, the control shall calculate the required air quantities between the ventilation minimum and the cooling maximum volume settings and modulate the primary air damper to maintain the volume setpoint. The controllers shall also provide cooling calculations to the central control unit to adjust the air handler static pressure setpoint to satisfy the local demand for cooling. If the space temperature falls below the heating temperature setpoint, the processor shall modulate the reheat coil valve and vary the air volume between the ventilation minimum and the heating maximum volume setpoints in a linear fashion to satisfy the space temperature hearing setpoint. If heating water is not available, the central control unit shall lock out the heating volume setpoints to prevent space sub cooling. Note: all valves shall be 3-way.

B. Unoccupied mode: On a fall in space temperature below 58 (programmable), the VAV reheat valve shall open and the zone controller shall signal the air handler to start for unoccupied setback. Building occupants may access the internet to override the air handler for a programmable time period of 1 - 4 hours to bring their zone back up to the occupied setting.

C. Warm up mode: If the central control unit determines it necessary to operate the system in the warm up mode, to reduce building warm up time, the zone controller, if heating is needed, shall modulate the VAV box damper to the heating maximum velocity set point and modulate the radiation valve and reheat coil valve to maintain the heating space temperature setpoint. If no heating is required, the primary damper on the VAV box shall close until the warm-up mode is terminated.

4.4 EXHAUST FANS:

A. The exhaust fan serving the toilet rooms shall be enabled during the occupied hours and when the conference room is in an override mode. When enabled, the fan shall run and the parking area isolation damper shall open. The FMCS shall monitor fan status and alarm if the fan fails to operate.

B. The exhaust fan serving the electrical room and maintenance closet shall be enabled by a wall mounted thermostat on a call for cooling in the room. When enabled, the fan shall run and the parking area isolation damper shall open. The FMCS shall monitor fan status.

4.5 ELECTRIC IN-FLOOR HEATER:

A. Electric heater shall operate thru a stand alone thermostat during occupied hours.

B. Building Management System shall override the stand alone thermostats during unoccupied hours.

SECTION 16050 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the drawings and/or in these specifications, including all labor, services, permits, fees, utility charges, and incidentals necessary and required to perform and complete the electrical work described in this Division. Apply for all permits early in the project to avoid problems due to code revisions.

B. See the contract conditions (general and supplementary) and Division 1 for requirements concerning this Division including, but not limited to, submittals, shop drawings, substitution requests, change orders, maintenance manuals, record drawings, coordination, permits, record documents and guarantees.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Mechanical equipment motors to be furnished under another Division but connected under this Division. Starters to be mounted and connected by this Division, but furnished by another Division unless otherwise noted on the electrical drawings. Motor control centers shall be furnished and installed under this Division of the work. Verify and coordinate all equipment locations and electrical characteristics with other trades involved in the work. Coordination shall be done prior to rough-in or ordering equipment.

B. Control wiring for mechanical equipment beyond provisions shown on the Electrical Drawings shall be performed under another Division of the work.

1.3 QUALITY ASSURANCE:

A. Do all work in accordance with regulations of serving electric utility, telephone utility, cable TV utility, National Electrical Code, state and local codes and amendments, National Fire Codes, and all other applicable codes.

1.4 PROJECT CONDITIONS:

A. The Contractor shall inspect the job site prior to bidding and familiarize himself with existing conditions which will affect the work. Prior to start of work, obtain "As built", "Record", or other Drawings showing existing underground utilities.

B. Electrical drawings are diagrammatic indicating approximate location of outlets, lighting fixtures, electrical equipment, etc. Consult the Architectural, Structural, and Mechanical Drawings to avoid conflicts with equipment, structural members, etc. When required make all deviations from Drawings to make the work conform to the building as constructed, and to related work of others. Minor relocations ordered prior to installation may be made without added cost to Owner.

C. Call to the attention of the Architect any error, omission, conflict or discrepancy in Drawings and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made.

D. Under no conditions are beams, girders, footings or columns to be cut for electrical items unless so shown on Drawings or written approval obtained from the Architect.

E. Verify the physical dimensions of each item of electrical equipment to fit the available space and promptly notify the Architect prior to roughing-in if conflicts appear. Coordination of equipment to the available space and to the access routes through the construction shall be the Contractor's responsibility.

1.5 SHOP DRAWINGS:

A. Prior to ordering equipment, and prior to Contractor's first application for payment, the Contractor shall, within 30 days after award of this work, submit six (6) complete lists, neatly bound in 3-ring binder form, with indexed tabs, to the Architect, of materials and equipment he proposes to furnish. List shall bear Contractor's stamp, signature or other means to show that he has inspected same and certified that submitted material is correct in regard to quantity, size, dimension, quality and is coordinated with the Contract Documents.

B. Each list shall show cuts or pictures, type, size, rating, style, catalog numbers and manufacturer's name of each item.

C. Provide complete materials (all materials) list showing "Specification Section", "Material Item", "Manufacturer's Name and Catalog Number", and all pertinent data.

D. Contractor agrees that Shop Drawing Submittals processed by the Architect are not Change Orders; that the purpose of Shop Drawing Submittals by the Contractor is to demonstrate to the Architect that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

E. Contractor further agrees that if deviations, discrepancies or conflicts between Shop Drawings and Specifications are discovered either prior to or after Shop Drawing Submittals are processed by the Architect, the design Drawings and Specifications shall control and shall be followed.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. All materials shall be new and bear manufacturer's name, model number, electrical characteristics and other identification. All equipment to be U.L. approved if applicable.

B. Material and equipment shall be standard product of manufacturer regularly engaged in production of similar material for at least five years (unless specifically exempted) and shall be manufacturer's latest design.

C. If the description of a product is in conflict with the product as specified in the catalog number, the description shall generally take precedence. Contact the Architect for clarification if this occurs.

D. All equipment for essential or life safety systems must be rated and certified for the appropriate seismic zone.

2.2 DISCONNECTS:

A. Safety and disconnect switches to be General duty quick-make, quick-break, dual rated, lockable, and of such electrical characteristics as required for the load served. Switches to have defeatable cover interlock.

B. Fuse clips shall accept Class R or Class L fuses if required. Motor rated toggle switches equal to Square D Class 2510, type F with thermal overloads may be used as motor disconnects in dry locations.

C. Disconnect switches required by code shall be installed whether or not specifically shown on the Drawings. Disconnect switches for refrigeration equipment and multiple motor HVAC equipment shall be fusible type.

D. Safety and disconnect switches (fuse, non-fuse or circuit-breaker type) to be of same manufacturer as switchgear and panelboards.

2.3 FUSES:

A. Provide fuses as indicated on the drawings, sized per NEC, or as required by the equipment manufacturer, whichever provides maximum protection, for a fully operational system.

B. All fuses shall be furnished of the same manufacturer.

C. All fuses shall be installed by the electrical contractor at job-site and only when equipment is to be energized. Fuses shall not be installed during shipment.

D. All fuses to be 200,000 AIC, Current-limiting, U.L., Time Delay, Dual-element Type as follows:

For feeders 600 Amps and less:
Class RKk-1 for 600 volt; LPS-RK, LLS-RK, & A6D-R
Class RK-1 for 250 volt; LPN-RK, LLN-RK, & A2D-R
Class J; JHC, JTD, & AJT
For motor circuits beyond the main and subdistribution boards, 600 volt and below:
Class RK-5 for 600 volt; FRS-R, FLS-R, & TRS-R
Class RK-5 for 250 volt; FRN-R, FLN-R, & TR-R

E. Provide 10% spare fuses, but not less than 3 of any one size and type.

F. Provide Spare Fuse Cabinet(s), #SFC, #LSFC, & ATFC as required. Install cabinet(s) in Electrical Closet.

G. Approved Manufacturers, with catalogue numbers listed in order: Bussman, Littelfuse, Ferraz Shawmut.

H. If the electrical contractor wishes to furnish materials other than those specified, a written request, along with a complete short circuit and selective coordination study, shall be submitted to the engineer for evaluation at least 14 days prior to the bid date. If the engineers evaluation indicates acceptance, a written addendum will be issued listing the other acceptable manufacturer.

2.4 BOXES:

A. Outlet and junction boxes shall be sized in accordance with code requirements or as noted on the drawings.

B. Unless otherwise specified or shown on the drawings, all outlet boxes for new work shall be galvanized steel knockout, outlet boxes. Gangable boxes are not acceptable. Outlet boxes shall not be smaller than 4" square and 1-1/2 inches in depth, unless otherwise noted. All outlet box covers, rings, or other fittings shall be galvanized. Boxes which are exposed to the weather shall be cast metal. Outlet boxes for phone and data outlets shall be 2.5" deep boxes.

C. Outlet boxes shall be designed for the intended use, and shall be installed flush with finish surface lines or not more than 1/8 inch back and shall be level and plumb. Long screws with spaces or shims for mounting devices are not acceptable. No combustible materials shall be exposed to wiring at outlets.

D. Outlet boxes on opposite sides of fire or sound isolating partitions shall have a minimum horizontal separation of 24". Back to back boxes are not permitted in any walls.

2.5 FIRE RATED POKE-THRU

A. Multi-service, fire rated poke-thru, unless otherwise shown, to be Hubbell PT4X4SFGY assembly, including service for power, communications and data in one unit. Unit shall be rated to UL514A for scrub water protection. Provide four power outlets, each 20 amp rated. Provide locations w/ dust cover plats for up to four category 5e or category 6 data outlets to fit poke through, outlets to be selected by the owner. Category 5e and category 6 wiring and the outlets in the assembly are under separate contract. Trim Color and material, and plate color and material as directed by the Architect.

B. Conduits for future voice and data cable shall be connected to EMT conduits as shown. Open wiring will not be allowed.

C. Floor boxes which contain voice and data cable often are shown with an empty conduit running up a wall and into the P3 level ceiling. Where no conduit is shown, stub a 1" conduit out the bottom of the low voltage section of the box and into the ceiling space of the floor above.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION METHODS:

A. Cutting or notching shall be kept to an absolute minimum and done when, and in a method approved by the Architect. Patch and correct finished surfaces damaged by electrical work.

B. Relays, panels, cabinets and equipment shall be level and plumb and installed parallel with structural building lines. All equipment and enclosures shall fit neatly without gaps, openings, or distortions. Provide approved devices for closing all unused openings.

C. Arrange circuit wiring as shown on the Drawings and do not alter or combine runs or homeruns without the specific approval of the Architect. Feeder runs shall not be recombined or altered.

D. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls which are common to occupied space.

E. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

F. In general, the mounting heights shall be as noted on the Drawings, or as listed below, the Architectural Interior Elevations and drawing notes taking precedence. Where no heights are indicated, request clarification from the Architect. Consult the Architectural, Mechanical and Structural drawings to avoid conflicts prior to roughing-in and for exact locations. All dimensions are to the center of the device unless otherwise noted. Lighting dimensions are to the bottom of suspended fixtures and center of wall mounted fixtures unless otherwise noted.

Light Switches	48 inches
Convenience Receptacles	18 inches
Panelboard top	72 inches
Fire Alarm Signals	80 inches to top (but at least 6" below ceiling)
Firefighter communication	48 inches
Telephone Outlets	18 inches
Receptacles and Outlets Over Counters	8 inches above counter or 3 inches above backsplash, whichever is greater.

G. Where raceways penetrate floors, ceilings, ducts, chases, and fire walls, provide fire stopping to maintain integrity of the fire assembly. Firestopping method shall be approved by the Code Authority having jurisdiction.

H. All materials and equipment installed under this work shall be properly and adequately supported from the building structure except where ceiling construction or other provisions are specifically designed to support them. Support systems shall provide a safety factor of four. This shall apply to chains, hangers, anchors, clamps, screws,

structural iron, and all other hardware and appurtenances associated with the support system.

I. Rough-in for communications outlets for phone and data systems shall consist of a 4" square deep (4SD) box with a single gang mud ring. Provide a 3/4" conduit homerun for boxes containing three or less jacks, and a one inch conduit for four or more jacks. Conduit shall be terminated at the telecommunications closet in a grounding bushing and a pull string installed.

J. Maintain the following minimum separations from voice and data conduits. Power conduit - 12", transformers and motors - 40", fluorescent lighting - 12". Coordinate with the voice and data installer to assure these separations are met.

3.3 LOW VOLTAGE WIRING METHODS:

A. Unless stated otherwise in these specifications, or on the drawings, raceways for wiring of Computer, and Telephone systems utilizing N.E.C. class II current limitation methods will be required throughout.

B. Provide a box, plaster ring, and conduit with insulated bushing from each wall or floor outlet to an accessible ceiling or crawl space. Conduit shall be minimum 3/4" for telephone/data, minimum 1" for TV, and sized as needed for other systems. Drawings notes shall take precedence. Raceways for phone and data cable shall be sized based on the number of cables in accordance with the following guidelines.

3/4" conduit - max 5 cables
1" conduit - max 11 cables
1.25" conduit - max 19 cables
1.5" conduit - max 25 cables
2" conduit - max 40 cables

C. Verify that raceway sizes and quantities are appropriate and will have at least 50% spare capacity after all cables are initially installed. Provide at least one empty spare conduit to each area, sized to handle future needs.

3.4 LABELING:

A. Clearly and properly label the complete electrical system to indicate the loads served or the function of each item of equipment provided under this work.

B. Nameplates shall be 1/16 inch thick, laminated three-ply plastic, center-ply white, outer-ply black "Lamicoid" or equal. Letters shall be formed by engraving outer black ply, exposing white center-ply. Nameplates shall be secured with screws or pop rivets.

C. Provide a master nameplate at the main distribution to identify the project, the Engineer and the date. Clearly label switchboards with engraved nameplates to identify each load served.

D. Label all electrical contactors, relays, time switches, transformers, etc. with an engraved nameplate corresponding to the labeling in the main, subdistribution, or branch panel serving the device or apparatus.

E. Provide typewritten branch panel schedules with protective clear, transparent covers accounting for every breaker installed. Use actual room designations assigned by name or number near completion of the work, and not the designations shown on drawings.

F. Identify branch panels with engraved nameplate corresponding with distribution panel labeling. Mount labels inside door for flush panels, and on the face of the door for surface panels. No brand labels or other marking shall be on the outside of the panels. Where changes are made in existing panels, distribution boards, etc., provide new labeling and schedules to accurately reflect the changes.

3.5 SAFETY:

A. The Engineer has not been retained or compensated to provide design and construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the contractor to perform the work.

3.6 GROUNDING:

A. Ground all electric equipment, raceways and enclosures in accordance with code rules and established safety practices. Provide a single main grounding point where grounding conductors from the Grounding Electrode System at the main switchgear may be terminated.

B. No. 12 grounding conductors shall have green insulation.

C. All isolated ground buses shall be used only for conductors from isolated ground receptacles. Do not bond conduit or enclosures to isolated ground buses. All isolated ground conductors shall be run back to the main ground point for the separately derived system which serves them.

D. Provide a #4 grounding conductor to all telephone, data processing and sound system terminals throughout project. Provide a wall mounted busbar assembly equivalent to Square D Class 1630-PK15GTA/PKGTAB

3.7 TVSS (Transient Voltage Surge Suppression) INSTALLATIONS

A. When TVSS units are specificed, they are to be shipped with complete installation instructions which are to be followed in detail. The manufacturer's representative is always to be contacted and is to supervise the TVSS installation.

B. Supplemental installation information is as follows:

1. Use the breaker space closest to the neutral bus. Nipple the suppressor to the panel where the suppressor can be installed so as to keep both the hot leads and the neutral lead as **short and straight** as possible from the suppressor to the breakers and the neutral bus.

2. The best performance is achieved with the shortest leads and neutral. **All efforts within the code should be used to minimize the lead lengths.** Ideally the leads should be less than eight inches long. Each inch of lead above six inches will add approximately 20 volts to the quoted let-through voltage. Cut the leads down to the shortest size that will allow installation.

3. If the neutral bus is out of reach of the leads, then a #4 AWG conductor is to be run from the remote neutral bus to a lug near the suppressor, and the lead from the suppressor should be cut as short as possible.

4. The ground is to be connected to the case of the panel (equipment ground only). Do not connect the suppressor ground wire to an isolated ground (IG) bus.

3.8 EQUIPMENT CONNECTIONS:

A. The location and method for connecting to each item of equipment shall be verified prior to roughing-in. The voltage and phase of each item of equipment shall be checked before connecting. Motor rotations shall be made in the proper direction. Pump motors are not to be test run until liquid is in the system and proper lubrication to all bearings in unit is checked.

B. Conduit, wire and circuit breaker sizes for mechanical, and similar equipment are based on the equipment ratings of one manufacturer. The equipment actually furnished may have entirely different electrical characteristics. Conduit, wire, circuit breakers, disconnects, etc. shall not be ordered or installed until exact electrical requirements are obtained. Responsibility for this coordination rests with the Contractor.

3.9 SEISMIC BRACING:

A. Furnish and install all seismic bracing of equipment, feeders, and other electrical items in accordance with prevailing codes. Provide and submit the required designs, calculations, certifications, and stamped drawings to the authority having jurisdiction and obtain their approval prior to installation or fabrication.

3.10 PAINTING:

A. All electrical equipment and conduit exposed in finished areas and on exterior walls are to be painted to match surrounding surfaces.

B. Contractor shall coordinate the timing of painting requirements.

C. Refer to Architectural specifications for methods and materials.

3.11 PROJECT RECORD DOCUMENTS:

A. Maintenance of Documents:

1. Maintain at Jobsite, One Record Copy of: Contract Drawings, Specifications, Addenda, Reviewed Shop Drawings, Change Orders, Other Modifications to Contract and Field Test Records.

2. Keep apart from documents used for construction.

3. Keep documents available at all times for inspection by Architect.

B. Recording:

1. Label each document "PROJECT RECORD."

2. Keep record documents current. Do not permanently conceal any work until required information has been recorded.

3. Contract Drawings, legibly mark to record actual construction; including but not limited to the following:
   a. Depths of various elements; locations of underground items, with dimensions to building walls and corners; changes of dimensions and details; changes made by Addendum, Field Orders or Change Order.
   b. Specifications and Addenda; Legibly mark each Section to record changes made by Addendum, Field Order or Change Order.

C. Submittals:

1. At completion of project, transfer changes to clean new prints and specifications which will be supplied by the Architect and deliver to the Architect as "As-reported Record" drawings .

3.12 COMPLETION:

A. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of faults, shorts or unintentional grounds. Demonstrate system in the presence of the Architect, the Owner or their representative when requested.

3.13 FINAL OBSERVATION:

A. Contractor shall submit written certification that:

1. Contract Documents have been reviewed.

2. Contractor has inspected Project for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and Systems have been tested and are operational.

5. Project is completed and ready for final inspection.

B. Architect will make final inspection as soon as possible after receipt of Certification.

C. Should Architect consider that work is finally complete in accordance with Contract Document requirements, Contractor shall make Contract Closeout submittals.

D. Should Architect consider that work is not finally complete:

1. He will so notify Contractor, stating reasons.

2. Contractor shall take immediate steps to remedy deficiencies, and send second written notice to Architect certifying that work is complete.

3. Architect will re-inspect work.

E. The Architect will make two final inspections. The first will determine deficiencies and errors in the work and the second will determine whether or not the noted deficiencies and errors have been satisfactorily corrected.

F. If additional inspections are required because of the Contractor's failure to complete the deficiencies and errors prior to the second inspection, costs for the successive inspections will be back-charged to the Contractor by the Owner, who, in turn, will reimburse the Architect. Charges will be based as follows:

1. Architect time at current billing rates.

2. Travel time, and all other expenses incurred in making inspections.

G. Contractor to provide one (1) journeyman, tools, meters, instruments and other test equipment required by Architect. Contractor to remove and replace trims, covers, fixtures, etc., for Architect to review and test materials, systems, methods and workmanship. (Example: Removing switchboard and panel covers to take voltage/amp readings, review connections and wire size, etc.)

END OF SECTION

SECTION 16120 – WIRES AND CABLES

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all wires and cables as herein specified and shown on the associated drawings.

1.2 QUALITY ASSURANCE:

A. All wire and cable shall conform to Code and shall meet all ASTM specifications.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. No. 10 and 12 AWG conductors shall be Type "THWN" insulated, stranded or soft drawn solid copper. No. 8 AWG and larger conductors shall be Type "THWN" insulated, soft drawn, Class B stranded copper. Minimum conductor size shall be No. 12 AWG unless otherwise noted.

B. Where adverse conductor exposure exists, code approved insulation suitable for the conditions encountered shall be used unless shown otherwise on the Drawings.

C. Wire and cable shall be new, shall have grade of insulation, voltage and manufacturer's name permanently marked on outer covering at regular intervals and shall be delivered in complete coils or reels with identifying size and insulation tags.

2.2 COLOR CODE:

A. All wire shall be fully colored in sizes 12 and 10 AWG, and color banded at each end and at all junction and pull boxes for size 8 AWG and larger.

B. Color Code throughout the project shall be:

1. 480Y/277V System

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	Grey
Equipment Ground	Green

2. 208Y/120V System

Phase A	Black
Phase B	Red
Phase C	Blue

Neutral	White
Equipment Ground	Green
Isolated Ground	Green w/yellow stripe #12 & #10 Green and Yellow bands #8 and up

PART 3 - EXECUTION

3.1 SPLICES AND TERMINATIONS:

A. Splices are to be made up complete promptly after wire installation. Single wire pigtails shall be provided for fixture and device connections. Wirenuts may be used for fixture wire connections to single wire circuit conductor pigtails.

B. Splices shall utilize Scotch "Hyflex" or "Ideal" wing nut connector installed properly. Splices for No. 8 and larger wires shall be made with mechanically applied pressure type connectors. All taped joints shall be with "Scotch 33+" or equal, applied in half-lap layers without stretching to deform.

C. Insulation shall be removed with a stripping tool designed specifically for that purpose. A pocket knife is not an acceptable tool. All conductors shall be left nick-free.

D. Thermoplastic insulated wire and cable shall not be installed or handled in temperatures below +14 degrees F (-10 C). Cross-linked polyethylene insulated wire and cable may be installed to -40 degrees F (-40 C).

END OF SECTION

SECTION 16130 – RACEWAYS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all raceways, wireways and associated fittings as herein specified and shown on the associated drawings.

1.2 APPLICATION:

A. Electric metallic tubing (EMT), galvanized rigid conduit (GRC), intermediate metal conduit (IMC), flexible metal conduit, and PVC conduit may be used.

B. Schedule 40 PVC conduit may only be used below grade and in slabs on grade provided it doesn't penetrate more than 20% of the thickness of the slab. PVC may not be used above grade. Conduits larger than 1 inch shall be run below the slab.

C. GRC and IMC shall be used in locations subject to mechanical injury and for service conduit under buildings or concrete slabs.

D. EMT may be used only in dry and protected locations.

E. Flexible metal conduit will be permitted for branch circuit wiring. Flexible metal conduit shall be used for connection to all equipment subject to movement or vibration such as motors and transformers. All homeruns to panels shall be in EMT, IMC or GRC conduit.

F. Drawing notes requiring a specific type of raceway shall take precedence over the specifications.

G. Surface metal raceways equal to Wiremold (700 series unless noted otherwise) may be used only where specifically called for on the drawings or in the specifications. Such installation shall be directed by Architect.

H. Electrical wiring shall be in U.L. approved raceways and enclosures throughout.

I. 2" and larger conduits intended for use on primary communications services shall have minimum 48" radius sweep on all bends.

PART 2 - PRODUCTS

2.1 FITTINGS:

A. GRC and IMC shall be coupled and terminated with threaded fittings. Ends shall be bushed with insulating bushings equal to T&B 200 series.

B. Connectors and couplings for EMT shall be steel concrete tight set screw type with insulated throats on connectors. Connectors larger than 1-1/4 inch shall be T&B 200 series insulating bushing.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Provide pull boxes where shown or required to limit the number of bends in any run to not more than three 90 degree bends. Use code gauge galvanized sheet steel boxes of code required size with removable covers, installed so that covers will be accessible after work is completed. Verify with the Architect any locations in finished areas.

B. Conceal all wiring in finished spaces. Exposed raceways shall be parallel to structural lines.

C. Support suspended feeder conduits by metal ring or trapeze hangers with threaded steel rods. If a large number of suspended feeders are grouped together, the contractor shall review the layout with the structural engineer and obtain approval for the proposed layout.

D. Conduit shall be adequately braced as required for Seismic Zone 3 installations per the SMACNA Seismic Restraint Manual, latest edition.

E. Expansion Joints:

1. All conduits three inches and larger shall be rigidly secured to the building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across the joint, equivalent to OZ/Gedney AXDX, installed per manufacturer's recommendations.

2. All conduits less than three inches shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits three inch and larger, may be installed.

F. Seismic Joints:

1. All conduits shall be provided with junction boxes securely fastened on both sides of the seismic joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit and copper green ground bonding jumper. Prior to installation, verify with Architect that the 15 inches is adequate for the designed movement, and if not, increase this length as required.

G. Conduit stubbed from a concrete slab or wall to serve an outlet under a table or to supply a machine shall have a rigid conduit coupling flush with the surface of the slab. Provide plug where conduit is to be used in future.

H. Provide a ground wire sized per code in all flexible metal conduit.

I. Raceways shall be left clean and free of debris.

J. Provide a pull string in all empty conduits.

K. All conduit to be 0.75" minimum.

END OF SECTION

SECTION 16140 – SWITCHES AND RECEPTACLES

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all switches, receptacles, and other devices as herein specified and shown on the associated drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Bryant, Arrow-Hart, Eagle, LaGrande, General Electric, Leviton, Hubbell are acceptable.

2.2 MATERIALS:

A. The following list of wiring devices covers the most commonly specified items and establishes the grade of device. Should the Drawings indicate a device other than those listed herein without reference to catalog number, such device shall be of the same grade and manufacturer as like devices.

Single Pole Switches	Hubbell #1221
Duplex Receptacles - 20 amp	Hubbell #5362
Duplex Receptacles-Isolated Ground	Hubbell #5362-IG, Orange
Switch with Pilot	LaGrande #20AC1

All wiring devices and plates to be specification grade. Receptacles shall be mounted vertically with the ground pin down unless otherwise noted.

B. Color of devices and material of plates to be selected by Architect. Provide nylon or stainless steel plates in finished areas, include worst case in bid. Restrooms, and food preparation areas to have 302 stainless steel plates. Receptacles fed by emergency circuits shall have red devices with "EMERGENCY POWER" engraved in white letters on a red nylon plate with panel and circuit designation engraved on plate. Receptacles fed by UPS circuits shall have yellow devices with "UPS POWER" engraved in white letters on a red nylon plate with panel and circuit designation engraved on plate.

C. Flush floor fire rated pokethroughs to be fourplex and to have brass, slide style lids. (See 16050, 2.4, E.)

PART 3 - EXECUTION

3.1 LABELING:

A. Where switches control remote lighting or power outlets, or where switches in the same outlet (two or more) serve different purposes, such as light, power, intercom, etc. or different areas, such as corridor and outside, furnish engraved plates with 1/8 inch black letters indicating function of each switch or outlet.

B. Provide a separate GFI type receptacle for each receptacle noted on plans as GFI. Standard receptacles fed from an up-steam GFI type receptacle are not acceptable.

END OF SECTION

SECTION 16461 – TRANSFORMERS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all transformers as herein specified and shown on the Drawings.

1.2 SUBMITTALS:

A. Submit complete and descriptive shop drawings indicating dimensions and compliance with the specifications herein. Submit in accordance with the general conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Square D, Cutler Hammer, General Electric, Siemens, Acme, Federal Pacific.

B. Requests for substitution of other products will be considered if submitted in accordance with the general conditions.

2.2 EQUIPMENT:

A. KVA and voltage ratings shall be as specified on the Drawings.

B. Transformers of the size and type covered by U.L. Specification 506 shall be so labeled and listed. All transformers must be constructed and rated in accordance with all applicable ANSI, NEMA, and U.L. standards. Minimum 4% impedance.

C. Transformers 37-1/2 KVA three phase and larger shall incorporate a U.L. recognized Class 220 degree C insulating system. Transformer temperature rise shall not exceed 150 degree C. in a 40 degree C. ambient unless shown otherwise on the drawings.

D. Transformers 5 KVA and larger shall be capable of meeting the overload requirements of ANSI Standard C57.12. Transformers 15 KVA and larger shall have NEMA standard taps. Sound levels shall be equal or lower than those established in ANSI Standard C89.2.

2.3 TRANSFORMERS FOR NON-LINEAR LOADS:

A. Transformers shown on the one line diagram with a "K= 13" designation shall be suitable for non-linear loads and shall be designed with the K factor stated on the drawings. Such transformers shall have a maximum hot spot temperature of 220 degrees centigrade. The transformer secondary neutral terminal shall be sized for 200% of the secondary phase current.

B. Transformers shall have a full width electrostatic shield between primary and secondary with a maximum effective coupling capacitance of 33 picofarads.

C. Common mode noise and transient attenuation shall be no less than 40db at 1 MHz. Transverse mode attenuation shall be no less than 30db at 1 Mhz.

D. Transformers less than 300 KVA shall have a maximum of 4 percent impedance.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Transformers shall be installed with special consideration given to the transmission of hum noise through structure or conduit system. Provide 1-1/2" neoprene vibration isolation dampers under each corner of transformer, equal to Mason Industries type "ND".

B. Flexible conduit to be installed between the conduit system or panel and transformer. Provide slack in flex conduit to reduce noise transmission. This contractor shall be responsible for correction of excessive hum conditions.

C. Transformer taps are to be adjusted to the proper voltage after system is in operation.

END OF SECTION

SECTION 16470 – PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all branch circuit panelboards as herein specified and shown on the drawings.

1.2 SUBMITTALS:

A. Submit complete and descriptive shop drawings indicating dimensions and compliance with the specifications herein. Submit in accordance with the general conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Square D, Siemens, General Electric, Cutler-Hammer/Westinghouse

B. Requests for substitution of other products will be considered if submitted in accordance with the General conditions and Division 1.

2.2 EQUIPMENT:

A. Panels shall be factory pre-assembled using bolt-on circuit breakers, equivalent to Square D NQOD series. Separate feeder lugs shall be provided for each feeder conductor.

B. Breakers in branch panelboards shall be not less than 3/4 inch on centers. Each breaker shall be securely fastened to prevent movement and trims shall fit neatly and tightly to the breaker assembly. Two and three pole breakers shall be single breaker assembly rather than two or three single pole breakers with the handles tied together externally.

C. Panel finish shall be a flat, light gray finish suitable for painting over or being left with factory finish. Flush mounted panels in finished walls shall be painted to match wall, paint and paint preparation to be as specified by Architect. Panel covers to be painted off wall, then installed over painted wall surface. Trims to be separately packed and protected from scratching and marring. Refer to labeling requirements in 16050 Basic Materials and Methods.

D. Panel bussing shall be copper only.

E. Panel covers to be "Door in Door" or "Hinged Trim Front" style to permit authorized personnel to open the outer door and have access to the entire interior of the can. The inner door shall access only the breaker handles. Provide flush stainless steel cylinder lock with catch and coil spring loaded door pull. All panels shall be keyed alike, but inner and outer doors shall not be keyed alike.

F. Where grounding conductors are shown or specified, provide each panel and distribution center with grounding bus to which the grounding conductors shall be connected, each having its own terminal or lug.

G. Where Isolated Grounding (IG) conductors are shown or specified, provide each panel and distribution center with an Isolated Grounding bus to which the IG conductors shall be connected, each having its own terminal or lug. The IG grounding system shall be fully separated and insulated from the IG receptacle to the System Grounding Electrode. Provide a second ground bus bonded to the panelboard can for termination of conduit and equipment bonding conductors.

H. Panelboards rated 400 amps or less shall not exceed 6" depth.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Breaker handle guards shall be provided on each circuit supplying obviously constant loads to prevent accidental shutting off. Such loads are refrigeration, contactor controlled circuits, freeze protection, etc.

B. Furnish and install three spare one inch conduits from the top of each recessed panel, to an accessible point above the ceiling.

C. Care shall be taken to terminate ground conductors from isolated ground receptacles only on the isolated ground bus in a panel. Do not terminate bonding conductors on an isolated ground bus.

END OF SECTION

SECTION 16490 – TRANSIENT VOLTAGE SUPPRESSION

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Furnish all labor, materials, equipment and services necessary for and incidental to the installation of the Transient Voltage Surge Suppression (TVSS) System components at panelboard PP3 in the electrical closet. TVSS shall be an integral component of the panelboard.

1.2 QUALITY ASSURANCE:

A. The TVSS shall be UL Listed as a Transient Voltage Surge Suppressor, category C, UL 1449 Second Edition (including Sections 34 and 37, effective August 16, 1998). All UL 1449 test data shall be provided with submittal.

B. The TVSS shall bear suppressed voltage rating issued by UL, and the units shall be tested in accordance with ANSI/IEEE C62.41-1991, Category C, 20kV/10kA, 8x20 uS and 1.2x50 uS Combination Waveform and .5uS - 100kHz Ring Wave with a minimum of 10 sequential impulses delivered directly into the TVSS at a maximum of sixty second intervals for each waveform.

C. Manufacturers Qualifications: Only firms regularly engaged in the manufacture of TVSS products for category C (ANSI/IEEE C62.41), and whose products have been providing satisfactory service for not less than ten years, shall be considered. Manufacturer qualifications shall be provided as part of the submittal.

D. The TVSS must be capable of surviving 1000 sequential surges without failure, using IEEE test procedures established in C62.45.

E. The TVSS device must be capable of handling a minimum surge current of 150,000 amps per phase.

F. The TVSS devices must be rated for a minimum total energy dissipation of 7,360 joules.

1.3 SUBMITTALS:

A. Submit complete and descriptive shop drawings in accordance with Section 16050 and the general conditions.

B. Submit all related TVSS Specifications and drawing information requested in this document and U.L. 1449 Second Edition surge suppression ratings for the TVSS. In order for a TVSS system to be considered, all responses to information requested in this specification must be provided in writing. If a manufacturer cannot comply with any

portion of this specification, this must be stated in the reply and the reason for non-compliance shall be provided.

C. Submit operation and maintenance data in accordance with the general conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Liebert, LEA International, Current Technologies, Advanced Protection Technologies, United Power, Intermatic Inc, Cutler Hammer, Square D, GE, Siemens.

B. Requests for substitution of other products will be considered if submitted in accordance with the general conditions.

2.2 TVSS EQUIPMENT:

A. The TVSS shall be suitable for application in category C environments as described in ANSI/IEEE C62.41. The TVSS shall be of parallel design and provide protection from Line to Ground, Line to Line, Line to Neutral, and Neutral to Ground.

B. The TVSS shall be compatible with the electrical system voltage, current, configuration and intended application.

C. The TVSS maximum continuous operation voltage (MCOV) shall be capable of sustaining 100% of the nominal RMS voltage continuously without degradation.

D. The TVSS shall only use solid state clamping components connected in parallel with the supply to limit the surge voltages.

E. Provide visual or audible indication of properly performing protection.

F. Provide a surge counter.

G. House in the appropriate NEMA rated enclosure.

H. Warranty shall be for full replacement without pro-rating value, for a minimum period of 5 years.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Ship with complete installation instructions which are to be followed in detail. The manufacturer's representative is to be contacted and is to supervise the installation.

B. Installation shall comply with all applicable State and National Electrical Codes, including NEC Articles 240, 250, 310 and 280. Provide overcurrent protection and a means to disconnect power from unit. All fuses utilized for the TVSS overcurrent protection shall be of the Time Delay type rated for the available fault current at the location of installation.

C. Phase, neutral and ground leads of installed TVSS must be grouped and twisted together up to the point of connection at the bus or overcurrent device. Lead lengths must be as short as possible, avoiding bends where possible. In no case will lead lengths greater than sixteen inches or sharp bends in leads be permitted. Lead length is measured from switchboard bus to point of connection to TVSS device.

D. Conductors must terminate with compression type lugs.

E. Mount so that suppressor indicator lights will be clearly visible after installation.

F. Overcurrent and disconnect devices shall be exclusively utilized for the TVSS device.

G. Raceway from TVSS to switchboard shall consist of rigid steel conduit with double locknuts and grounding bushings connected to switchboard ground.

H. Overcurrent protection sizing shall be as per manufacturers instructions. Conductor sizing shall be based on NEC requirements.

END OF SECTION

SECTION 16500 – LIGHTING

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide light fixtures with lamps and accessories as herein specified and shown on the drawings.

1.2 QUALITY ASSURANCE:

A. If the catalog number of a specified fixture should conflict with the fixture description or the general lighting specifications, such conflicts shall be brought to the attention of the Architect prior to bidding.

1.3 SUBMITTALS:

A. Submit complete and descriptive submittals.

B. Verify that fixture description matches that which is indicated by the specified catalog number.

C. All features mentioned in the fixture list shall be highlighted on the submitted items.

D. Submit lamp intended for use with each fixture.

E. Submit Operation and Maintenance data. See 16050.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. See Fixture Schedule for acceptable manufacturers.

B. Requests for substitution of other products will be considered if submitted in accordance with the general conditions.

C. Substitution requests for fixtures equal to those specified shall include complete construction and photometric data including, if applicable, candlepower distribution curve, spacing to mounting height ratio, table of coefficients of utilization, isofootcandle curve, ANSI beam spread classification, efficiency, etc.

D. Submittals and substitution requests for fluorescent fixtures shall include the sheet metal gauge of the housing and the lens thickness, material, and pattern.

2.2 MATERIALS:

A. Polystyrene lenses and lenses less than 0.125 inches nominal thickness shall not be permitted unless otherwise noted.

B. Provide fixtures with Area Coverage, damp, or wet label if required for the application indicated.

C. All recessed fixtures shall be free of light leaks.

2.3 BALLASTS:

A. All ballasts shall be capable of providing reliable operation of the lamps at the lowest temperature normally encountered. The contractor shall confirm that the ballasts are appropriate for the ambient conditions.

B. Ballasts deemed excessively noisy shall be replaced without cost to the Owner.

C. T8 fluorescent ballasts, unless noted otherwise on Light Fixture Schedule, shall be electronic type; ballast data as follows:

UL listed and CSA certified.
Full light output. (100% to 5% for dimming ballasts).
Recognized Testing Laboratory listed, thermally protected, resetting, Class P, non-PCB, sound rated A.
Operate lamps at a frequency of 42KHz or higher with no detectable flicker.
Total Harmonic Distortion (THD) of 10% or less.
Full rapid start, and maintain full cathode heat during operation.
Power factor equal to or greater than 98%.
Maximum lamp crest factor 1.5.
Minimum lamp starting temperature of 50 degrees F.
Meet all current Federal, State and Power Co. efficiency and efficacy standards, and rebate program requirements.
Meet all current ANSI, IEEE, and FCC regulations for EMI/RFI, harmonic distortion, and transient protection.
Provide normal lamp life as stated by lamp manufacturer.
Minimum 5 year ballast and replacement labor warranty by manufacturer.
Ballast manufacturer's data must be included with lighting fixture submittals.

Coordinate dimming ballasts with dimming controls manufacturer.

Approved manufacturers: Advance, (Mark X for dimming), Osram, Magnetek.

D. Compact fluorescent ballasts, unless noted otherwise on Light Fixture Schedule, shall be electronic type; ballast data as follows:

UL listed and CSA certified.
Full light output (100% to 5% for dimming ballasts).
Recognized Testing Laboratory listed, thermally protected, resetting, non-PCB, sound rated A.
Operate lamp(s) at a frequency of above 42 kHz.

Total Harmonic Distortion (THD) of less than 20%.
Rapid start.
Power factor equal to or greater than 98%.
Maximum lamp crest factor 1.7.
Minimum lamp starting temperature of 0 degrees F.
Meet all current Federal, State and Power Company efficiency and efficacy standards, and rebate program requirements.
Meet all current ANSI, IEE, and FCC regulations for EMI/RFI, harmonic distortion, and transient protection.
Provide normal lamp life as stated by lamp manufacturer.
Minimum 5 year ballast and replacement labor warranty by manufacturer.
End-of-life detection and shut-down circuitry that meets proposed ANSI/IEC standards.
Ballast manufacturer's data must be included with light fixture submittal.

Coordinate dimming ballasts with dimming controls manufacturer.

Approved manufacturers: Advance (Mark X for dimming) Osram, Magnetek, Howard Industries.

E. All ballasts shall be high power factor (HPF) type, unless otherwise noted.

2.4 LAMPS:

A. T8 and compact fluorescent lamps shall be TCLP compliant, low mercury content, 3500°K type with a minimum CRI of 75, unless otherwise noted. All incandescent lamps shall be 130 volt, inside frosted unless otherwise noted (except Halogen). Acceptable lamp manufacturers are Osram/Sylvania, Philips, and General Electric.

B. All lamps and fixtures shall be in proper operation at the time of acceptance. Provide ten percent spare lamps, with a minimum of two, for each size and type used.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Fixtures installed under this work shall be properly and adequately supported from the building structure except where ceiling construction or other provisions are specifically designed to support the fixture units. Fixture support systems shall provide a safety factor of four. This shall apply to chains, hangers, anchors, clamps, screws, and all other hardware and appurtenances associated with the support system.

B. Fixture supports shall provide proper alignment and leveling of fixtures, and shall be arranged to maintain the alignment at all times. The final decision as to adequacy of alignment shall be given by the Architect.

C. All light outlets shall be supplied with a fixture. Outlet symbols on the drawings without a type designation shall have a fixture the same as those used in similar or like locations.

D. Fixture stem or chain lengths for industrial reflector or bare lamp strip fixtures shall be appropriate for the space and for coordination with other work such as ducts and piping. Provide swivel hangers for stem-hung fixtures.

E. Fixtures shall be left clean at the time of acceptance of the work and every lamp shall be in operation. The responsibility for cleaning or protecting fixtures from dirt, dust, paint, debris, etc. shall rest with the Contractor performing this division of work.

F. Prior to the purchase of any fixture, the finish shall be verified with the Architect.

G. Fixtures of a given description may be used in more than one type of ceiling. Consult the Architectural Reflected Ceiling plan to obtain this information. Some ceiling types may have changed immediately prior to bidding or by addenda or change order and the changes may not be reflected in the fixture list or fixture designations as shown on the plans. The contractor shall compare the electrical plans with the reflected ceiling plan and confirm that the specified fixtures are compatible with the ceiling system prior to ordering.

H. Where fixtures are mounted under cabinets, in soffits, coves, or other physically restricting spaces, the contractor shall verify that the fixtures will fit the space prior to ordering.

I. Undercabinet and similar fixtures are to be hard wired. Flexible cords similar to SO cord are not acceptable.

J. Air supply fixtures shall be supplied with pattern control vanes.

K. See Architectural plans for fire rated ceilings and coordinate fixture installation with general contractor to assure continuity of fire rating.

L. Do not mount fluorescent within 12" of any telecommunications conduit.

END OF SECTION

SECTION 16723 – FIRE ALARM SYSTEMS (EXISTING)

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. The Contractor shall furnish and install fire alarm devices, as specified herein and indicated on the drawings.

B. Provide all signal initiating devices, audible and visual alarm devices, power supply, a wiring system, and all accessory devices required to provide a complete operating system.

C. All components shall be compatible with the existing system. The existing system is EST, as distributed by Wasatch Electric Comtech Services. Spectrum West, Inc. and Lassco, may also bid the project if they desire.

D. The system shall comply with the applicable provisions of the National Alarm Code (NFPA 72), Americans with Disabilities Act, and meet all requirements of the local authorities having jurisdiction. All equipment and devices shall be listed by the Underwriter's Laboratories, Inc., or approved by the Factory Mutual Laboratories.

E. Add additional expansion components to the existing fire alarm panel and system as required to accommodate new initiating and warning devices which are being added to the system (detectors, call stations, strobes, horns, tamper switches, door holders, etc.)

1.2 SUBMITTALS:

A. Submit complete and descriptive shop drawings in accordance with the general conditions and Section 16050. Include keyplans, on architectural backgrounds, showing addresses and locations of all devices. Also include strobe candela setting on each speaker/strobe or strobe device. Include riser diagrams, and battery/voltage calculations for entire system. Show interconnect wiring between new NAC panel, and existing fire alarm system.

B. Submit plans and specifications to the governing Building Official. Obtain his written acceptance of, and procure and pay for all permits for, the system prior to beginning work and ordering equipment.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Match existing system Manufacturer of EST. No substitutions.

B. Arrange for the fire alarm system vendor to review the wiring and power supply capacity of the existing system. Increase the power supply capacity, signal circuit wire size, or add a remote power supply as needed to accomplish proper operation of the system.

PART 3 - EXECUTION

3.1 WIRING:

A. Furnish and install all required wiring in accordance with local and National codes.

B. Unless otherwise specified, minimum wire size shall be 16 gauge for audible alarm circuits, and 18 gauge for signal initiating circuits. All wiring shall be in conduit. Conduit shall be sized by the contractor, minimum size is ¾ inch. Conduit and wiring shall be class A, meeting all requirements of NFPA 72. See 16050 for wiring methods.

C. Refer to mechanical drawings for quantity, location and type of device to be connected to the fire alarm system. Provide additional zone modules in existing FA control panel.

D. Confirm that the existing power supply and circuiting have sufficient capacity to handle additional speakers and strobes. If insufficient capacity exists, add additional components to resolve the problem. This might include such items as replacing existing signal circuits with larger wire or replacing or providing new amplifiers or power supplies. All signal devices must operate properly at completion.

3.2 FIELD QUALITY CONTROL:

A. A factory trained representative of the manufacturer shall supervise the final testing of the system and it shall be subject to the approval and acceptance of the responsible Architect. On completion of the acceptance tests, the Owner or his representative shall be instructed in the operation and testing of the system.

B. The equipment manufacturer shall be represented by a local service organization and the name of this organization shall be furnished to the Architect and Owner.

C. Update and submit building keyplans. Mount adjacent to main FACP.

END OF SECTION

SECTION 16780 – TELEVISION SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide all equipment and labor necessary to provide raceways for a new master television distribution system. The scope of work of this section shall include system raceways. The riser diagram shown on the drawings is intended to show the general configuration of the system and does not indicate all devices needed.

1.2 QUALITY ASSURANCES:

A. Meet all requirements of raceways section 16120.

1.3 SUBMITTALS:

A. None required.

1.4 DESCRIPTION:

A. Provide minimum 1 inch raceway with nylon pullrope to all TV outlets as indicated on the plans.

PART 2 - PRODUCTS

A. Meet all requirements of raceways section 16120.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Main conduit runs shall be installed in lay-in ceiling areas for ease of future access.

B. Video conduits shall be kept a minimum of 6" from data conduits.

END OF SECTION

SECTION 16790 – ACCESS CONTROLS (EXISTING)

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Provide a complete turnkey access control relocation of the existing system. Include design, installation, equipment, wiring, materials, accessories, software, programming, documentation, testing, training and miscellaneous items required for a complete and operational system. Drawings indicate location of devices to be relocated. Manufacturer or authorized factory representative shall design complete system including wiring and interfacing with the security system.

1.2 SUBMITTALS:

A. None required.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A. See Section 16050 Basic Electrical Materials and Methods.

1.4 SYSTEM DESCRIPTION

A. The existing card access device on level P3 shall be relocated to a new door. Salvage all existing equipment for relocation.

PART 2 - PRODUCTS

2.1 Reuse existing.

PART 3 –EXECUTION

3.1 INSTALLATION:

A. The installation shall be accomplished with quality materials in a neat and workmanlike manner. Materials under this section or other sections of the specifications damaged during this installation shall be replaced with new materials at no additional cost to the Owner.

B. All wiring shall be concealed in conduit which is concealed from sight.

1.5 INSPECTION:

A. When all the equipment is properly installed, it shall be tested under the supervision of the factory representative. A deficiency list of all improper operating equipment or missing equipment shall be made. When all deficiencies are corrected and the

equipment has been thoroughly tested, and at mutually agreed time, a final inspection shall be conducted. The final inspection team shall consist of the factory representative, the installer and the Owner's representative.

1.6 TRAINING

A. Provide 4 hours of on site training utilizing the actual access control system. Training shall include at minimum the following: System programming, operating doors, photo badging and monitoring. At end of training, provide a certification letter indicating the training was given and understood by the attendees.

END OF SECTION

SECTION 16950 – OCCUPANCY SENSED LIGHTING CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. The Contractor shall provide all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.

B. The Contractor shall examine all general specification provisions and drawings for related electrical work required as work under Division 16.

1.2 SUBMITTALS:

A. Submit complete and descriptive shop drawings including floor plans, layouts, catalog cuts and other descriptive data indicating compliance with the specifications herein. Submit data sheets on sensors, control units and all junction boxes and mounting accessories, including all wiring diagrams. Submit in accordance with the general conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. The Watt Stopper, Inc., Mytech/Hubbell

B. Requests for substitution of other products will be considered if submitted in accordance with the general conditions.

2.2 DUAL TECHNOLOGY INFRARED AND ULTRASONIC SENSORS:

A. The Occupancy Sensors shall be capable of detecting presence in the floor area to be controlled, by detecting doppler shifts in transmitted ultrasound and passive infrared heat changes.

B. Upon entering a space, motion from both technologies must be sensed before lighting will be turned on. After this has occurred, detection in either technology will hold lighting on for the set time period. Sensors will have a retrigger time delay where only one motion is necessary to turn on the lights within 5 seconds after turning off.

C. Ultrasonic sensors will be volumetric in coverage. Up to 10 different passive infrared patterns will be available by lens selection. Detection shall be maintained when a person of average size and weight moves only within or a maximum distance of twelve inches either in a horizontal or vertical manner at the approximate speed of 12 inches per second. The sum of this distance, volume and speed represent the average condition an

Occupancy Sensor must meet in order that the lights will not go off when a person is reading or writing while seated at a desk.

D. Sensors will cover a minimum of 1500 square feet when mounted at 12 feet.

E. The sensors are designed to be wall mounted and not protrude more than 1.5 inches and should blend in aesthetically with the space.

F. Each sensing technology shall have independent sensitivity adjustments and LED display.

G. Sensitivity adjustment shall range from off at "0" to maximum at "10" for each technology.

H. Time Delay range shall be adjustable from 15 seconds to 15 minutes.

I. Sensors shall operate on 24 volts, 25 milliamps DC.

J. Sensor shall have an additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging, and other control options.

K. Sensor shall have an adjustable internal photo sensor with a 24VDC output after occupancy and a minimum light level is obtained. Adjustable from 5 to 400 Footcandles.

L. Ultrasonic circuit shall be solid state, crystal controlled with signal processing filtering.

M. Ultrasonic receivers shall be temperature and humidity resistant with less than a 6dB shift in the humidity range of 10% to 90% and less than a 6dB shift in the temperature range of -20o to 60o C.

N. Power supply shall be provided by UL listed Power Pack that consists of a transformer and contact closure relay in one package. Power output of the transformer shall be 100 ma, 24V DC, and shall be capable of operating a minimum of two dual sensors.

O. The ultrasonic frequency shall be 40 kHz + .006%.

P. Occupancy sensors shall have calibration at the occupancy sensor head, not at the power pack above the ceiling.

Q. Ceiling sensors OT-100L.

2.3 POWER PACKS:

A. Power Packs shall be mounted on external J boxes and be an integrated self-contained unit consisting of a load switching relay and a transformer.

B. Relay Contacts shall have ratings of:

10A - 120 VAC Tungsten
20A - 120 VAC Ballast

C. Relay contacts shall be isolated.

D. Power Packs: A-120E

E. Between sensors and controls units shall be three (3) conductors, 18 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable approved for use in plenums. One sensor shall be capable of driving four Power Packs.

F. Enclosures for Power Packs shall be NEMA I construction with mounting and barriers to provide separation between line and low voltage wiring or a standard four (4") inch junction box with control unit mounting to cover plate with 1/2 inch knockout. Boxes not located above accessible ceilings shall be painted to match finish color of mounting surface.

G. Occupancy sensors shall have calibration at the occupancy sensor head, not at the power pack above the ceiling.

PART 3 - EXECUTION

3.1 PERFORMANCE:

A. The objective of this section is to ensure the proper design and installation of the occupancy sensor based fluorescent lighting control system in rooms designated on the drawings so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.

B. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.

3.2 DESIGN:

A. It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas. Rooms shall have ninety (90) to one hundred (100) percent coverage to adequately cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the rooms(s). The sensor symbols shown on the drawings are diagrammatic and indicate only rooms which are to be provided with sensors. The contractor shall provide sensors as required to properly and completely cover the respective room. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. Sensors in small offices should be located to avoid false operation caused by persons walking by the door and outside the office.

B. Series connect Power Pack relays with lighting switches or other controls shown on the drawings.

3.3 WARRANTY:

A. Contractor shall warrant the system including all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The suppliers obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. Warranty on sensors and controls units will be for a period of five (5) years. The warranty shall commence upon the owner's acceptance of the project. Warranty on labor shall be for a minimum period of one (1) year.

3.4 INSTRUCTION:

A. The contractor shall provide, at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

END OF SECTION