



## **INVITATION TO BID – RE-BID**

**#21367**

**For**

### **Davis Aerospace & Maritime School Ground Floor Renovation**

FOR THE CLEVELAND MUNICIPAL SCHOOL DISTRICT  
DBA: CLEVELAND METROPOLITAN SCHOOL DISTRICT  
BOARD OF EDUCATION, 1111 SUPERIOR AVENUE E, SUITE 1800  
CLEVELAND, OHIO 44114

UNDER THE DIRECTION OF OPERATIONS DEPARTMENT OF THE BOARD OF EDUCATION OF THE CLEVELAND  
METROPOLITAN SCHOOL DISTRICT - CUYAHOGA COUNTY, OHIO

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## Part I: ITB Submission & Process Requirements

Part I of the ITB provides a detailed set of directions which the prospective bidder will use to prepare their bid.

Schedule for posting and bidder selection for the Davis Aerospace & Maritime School Ground Floor Renovation ITB 21367:

Step	Date*
ITB Posted	October 20, 2022
All final questions from service providers to the District	October 26, 2022
Answers to service providers from the District and all addenda issued (if necessary)	October 28, 2022
ITB Responses Due	November 2, 2022
Bid Opening	November 2, 2022
Contract Negotiation	November 14 - November 21, 2022
Contract Start	December 1, 2022

\*Dates listed are subject to change at discretion of the District. Service Providers will be notified of changes to the schedule, as appropriate.

### Section A: Bid Submission & Format Requirements

#### Bid Submission Requirements

- a. In order for the District to evaluate bids fairly and completely, service providers should follow the format set forth herein and provide all of the information requested. The District discourages costly bids.
- b. All bids shall include all bid format requirements found below. All information requested in the district related forms must be filled in legibly and completely with blue ink signatures, or the bid may be considered non-responsive. **Davis Aerospace & Maritime School Ground Floor Renovation and #21367 must be on the outside of the envelope of submittals including shipping labels.**
- c. Sealed Responses are due at the Cashier's Office of the Cleveland Metropolitan School District, 1111 Superior Ave E. Cleveland, Ohio 44114 on or before 1:00 PM current local time on November 2, 2022. Mailing of Bids are encouraged. However, hand deliveries will be accepted from **12:00 PM to 1:00 PM on November 2, 2022**. The bids will be opened following the bid cut off time at 1111 Superior Ave. E. Cleveland, Ohio 44114 on the 19<sup>th</sup> Floor.
- d. There will not be a pre-bid meeting for this project. Walkthroughs will be available upon request.
- e. All submissions must include one(1) original with blue signatures, one(1) copy, and one(1) electronic bid on a USB B Flash Drive. Original Copy should be easily identifiable. Electronic bid should include all documents. Prospective Bidders not complying with this requirement shall be notified that they have twenty-four(24) hours in which to comply with this requirement or their bid may be disqualified. This applies to copies only. All materials are submitted as is.
- f. All written questions shall be directed to the Purchasing Division via email to: [dion.turner@clevelandmetroschools.org](mailto:dion.turner@clevelandmetroschools.org). Written questions will be accepted via email until **12:00 pm on October 26, 2022**. Under no circumstances should any firm interested in providing the services identified in the ITB, their designees, or anyone affiliated with their firm, contact any other District employee or official during the ITB process, in an attempt to lobby or influence the selection of a service provider pursuant to this ITB

- g. The District reserves the right to reject any and all proposals, to waive any and all informalities or irregularities, and to disregard all non-conforming responsive conditional proposals. Each Proposer is liable for all proposal errors or omissions. A proposer shall not be permitted to alter or amend any proposal documents after the Proposal deadline time and date detailed in the RFP unless such is formally requested, in writing, by the District.

## Bid Format Requirements

- a. The Interior Renovations to H.B. Booker School specifications for ITB #21367 is described in Part III. Contractors are required to provide the information below as well as complete the District Related Forms in Appendix A.
- b. Bid Responses are to include the documents as follows:
  - i. **Transmittal Cover Letter:** Prepare a letter transmitting the bid on business letterhead. The letter should identify the business name, phone number, and business web address along with the name, phone number, and email address of the key contact person. The letter must have the signature of a person with authority to obligate the business. The transmittal cover letter shall also contain a statement that the bid is a firm offer for a ninety (90) day period.
  - ii. **Bid Cost Form**, including evidence of State certification to perform the work required.
  - iii. **Completed District Related Forms** set forth in Appendix A of this ITB.
  - iv. **Bid Guaranty:** A Certified Check for 10% of the total amount of the bid payable to the Treasurer of the Cleveland Metropolitan School District, or satisfactory bid bond executed by the bidder or a Surety company on a form supplied by the bondsman.

## Section B: Bid Constraints

- i. The service provider must comply with all laws, rules and regulations dictated by the Board of Education of the Cleveland Metropolitan School District, City of Cleveland, the State of Ohio and the United States Federal Government.
- ii. Purchases funded by federal grant funds must adhere to regulations found in Uniform Guidance "Super Circular", 2 CFR 200 (UGG), as a condition of receiving funds and to meet annual audit compliance. In an effort to keep policy for all grants consistent, the District implemented the new federal guidelines regarding procurement utilized with federal grants immediately.
- iii. The District will only accept proposals that cover all of the major components requested in the RFP.
- iv. Service provider shall not include Ohio Sales Tax in the price quoted. The District will provide tax exempt certificate to the successful Proposer.
- v. Service provider's personnel and subcontractors on the District site will be required to meet security requirements. Service provider agrees to successfully complete background checks on all of its employees, agents and subcontracts, if necessary, who provide services on site under this scope of work. Each person on site must wear an identification badge that clearly identifies and makes visible the person's name and company.
- vi. No response may be withdrawn for at least ninety(90) days after receipt of bids.
- vii. Bidder understands and agrees that subsequent to submission of the bid, any District resolution authorizing the award of a contract or agreement does not vest any contractual rights to the bidder.
- viii. Bidder understands and agrees that such District resolution operates only to encumber funds necessary for the project and does not create a binding contract.
- ix. Bidder further acknowledges and agrees that any such District resolution may be revoked, at any time prior to execution of a formal, written contract.
- x. Bidder acknowledges and agrees that it has no vested contractual right until such time as a purchase order or contract have been issued.
- xi. Bidder further acknowledges and agrees that execution of a contract and issuance of a purchase order

- is not a ministerial function but is a formal requirement for acceptance of a bid.
- xii. Bidder must present evidence to the District, upon request, that they are fully competent and have the necessary facilities, equipment and financial resources to perform the work required in the specifications within the time frame required.
  - xiii. The District reserves the right to award the bid in whole or in parts, by item, by group of items, to a single service provider or to multiple service providers, where such action serves the best interests of the District.
  - xiv. The successful Service provider and their subcontractor(s), including organizations having personnel, equipment and vehicles on District property, shall provide evidence of insurance as follows:
    - a. Commercial General Liability Including limited contractual liability  
\$2,000,000.00 Limit of Liability  
(Per occurrence)
    - b. Automobile Liability Including non-owned and hired  
\$2,000,000.00 Limit of Liability  
(Per occurrence)
    - c. Worker's Compensation Worker's compensation and employer's  
insurance to full extent required by applicable  
law
  - xv. This requirement must be fulfilled by the successful service provider providing the District with a current Certificate of Insurance (standard ACORD form), showing the Board of Education of the Cleveland Municipal School District as an additional insured (Certificate Holder does not constitute being an additional insured), within five(5) days of Notice of Intent to Award Agreement. The certificates of insurance shall contain a provision that the policy or policies shall not be cancelled without thirty (30) days' prior written notice to the District.
  - xvi. The required insurance must be provided by a company licensed by the State of Ohio, which company must be financially acceptable to the Administration of the Cleveland Municipal School District
  - xvii. The District is not liable for vandalism which results in damage(s) to the property or vehicles of the Vendor. The school District will not reimburse for private insurance deductibles for such vandalism.
    - a. Vandalism damage is defined as damage resulting from criminal conduct for which an individual may (but not necessarily be processed under the Ohio Revised Code
  - xviii. In submitting a bid, service providers agree, unless specifically authorized in writing by an authorized representative of the District on a case by case basis, that it shall have no right to use, and shall not use, the name of Cleveland Metropolitan School District, its officials or employees, in any advertising, publicity, promotion, nor to express or imply any endorsement of service provider's services.
  - xix. The Diversity Business and Service Provider Contract Compliance Programs shall make every good faith effort to ensure that certified diversity business enterprises in the District's relevant geographic market area shall be afforded the maximum opportunity to compete for contracts, services, and purchases. The general goals for diversity business participation are: 15% for services, 20% for goods and supplies, and 30% for maintenance, construction, and repair. Non-diversity vendors will have their diversity business participation counted toward their goal attainment only with minority vendors who are certified and demonstrate previous experience in the respective business classification of the prime contractor. Only direct participation in the subcontract will be counted toward diversity business enterprise goal attainment. Service Providers shall refer to <https://bit.ly/3wvVApK> for further information and requirements on the District's diversity goals.

### Section C: Evaluation Process

- i. **Responsiveness:** Bids will be evaluated, first, as responsive or non-responsive to the Bid specifications. A preliminary review will be conducted of all bids submitted on time to ensure the bid adheres to the material submission requirements specified in the Bid. Bids that do not meet the material submission requirements may be deemed non-responsive and rejected. In the event that all

bidders do not meet one or more of the material submission requirements, the District reserves the right to continue the qualitative evaluation of the bids and select the bid(s) which most closely meets the specifications in the ITB. Bids must include, or meet, the following submission requirements:

- a. Timely Submission
  - b. Transmittal Cover Letter
  - c. Bid Cost Form
  - d. District Related Forms
  - e. Bid Guaranty
- ii. **Qualitative Evaluation** – The Bids will be evaluated to determine the lowest responsive and responsible bidder.

#### **Section D: All District Related Forms**

There are a number of REQUIRED forms in Appendix A of the ITB that must be completed and submitted with the bid response. These forms include

- a. Addendum Acknowledgement
- b. Certificate of Debarment
- c. Conflict of Interest
- d. Proposer Qualification Form
- e. Non-Collusion Affidavit
- f. DBE Forms – A, B, C, D, E, F, G, & H
- g. EOA Contractual Declaration Forms
- h. References

#### **Section E: Award of Contract**

- i. The terms of this agreement will begin immediately upon selection, approval, and contract execution through completion of the lowest responsive and responsible service provider.
- ii. The contract documents consist of the following:
  - a. District Contract
  - b. Certified Purchase Order or Supplier Contract
  - c. ITB Submission Requirements
  - d. Bid Cost Form
  - e. Bid Guaranty
  - f. All Required District Related Forms
  - g. All applicable addenda
- iii. The awarded bidder shall perform all work described in the contract documents, including without limitation, all terms and conditions of the specifications contained herein or otherwise stated in the bid documents and reasonably inferable therefrom by the bidder as necessary to produce the results intended thereby for specifications requested herein by the District.
- iv. CMSD reserves the right to reject all bids and deviate from this purchasing process to utilize other purchasing mechanisms available to the district under Ohio Law. Scope review and follow-up discussions with the apparent low bidder may be requested. CMSD reserves the right to interview or to seek additional information related to criteria already specified in the Invitation to Bid after opening the bids prior to issuance a certified Purchase Order or Supplier Contract.

## Part II: Overview, Background, and Specifications

### Section A: Overview

The Cleveland Metropolitan School District (hereafter the "District") under ITB #21367 is seeking contractors to complete the Davis Aerospace & Maritime School Ground Floor Renovation.

The District is seeking a qualified contractor to furnish all labor, materials, and equipment necessary to renovate the ground floor at Davis Aerospace & Maritime School.

To facilitate submission and evaluation of bids, the following provides relevant background information and specifications. Instructions on how to submit a bid can be found in Part I. Contractors may submit a bid in response to the specifications below.

### Section B: Background

The District is a large urban school system with over 100 instructional non-instructional sites, approximately 6,000 teachers and administrative staff, 36,000 District students, and 3,500 classrooms.

### Section C: Specifications

#### SECTION 013220 - PHOTOGRAPHIC DOCUMENTATION

##### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
- B. Related Requirements:
  - 1. Section 01732 "Selective Demolition" for photographic documentation before selective demolition operations commence.

##### 1.2 INFORMATIONAL SUBMITTALS

- A. Digital Photographs: Submit image files within **three** days of taking photographs.
  - 1. Digital Camera: Minimum sensor resolution of **8** megapixels.
  - 2. Format: Minimum **3200 by 2400** pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  - 3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name of Contractor.
    - c. Date photograph was taken.

##### 1.3 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

##### PART 2 - PRODUCTS

##### 2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of **8** megapixels, and at an image resolution of not less than **3200 by 2400** pixels.

##### PART 3 - EXECUTION

##### 3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in file name for each image.
  - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before **commencement of demolition**, take photographs of Project site, including existing items to remain during construction, from different vantage points, as directed by **Architect**.

## **SECTION 013300 - SUBMITTAL PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Submittal schedule requirements.
  - 2. Administrative and procedural requirements for submittals.

#### **1.2 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

#### **1.3 SUBMITTAL SCHEDULE**

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

#### **1.4 SUBMITTAL FORMATS**

- A. Submittal Information: Include the following information in each submittal:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Architect.
  - 4. Name of Contractor.
  - 5. Name of firm or entity that prepared submittal.
  - 6. Names of subcontractor, manufacturer, and supplier.
  - 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
  - 8. Category and type of submittal.
  - 9. Submittal purpose and description.
  - 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  - 11. Drawing number and detail references, as appropriate.
  - 12. Indication of full or partial submittal.
  - 13. Location(s) where product is to be installed, as appropriate.
  - 14. Other necessary identification.



15. Remarks.
  16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Paper Submittals:
1. All submittals to be electronic except for material samples, initial color selection brochures, and similar.
  2. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
  3. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  4. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies to the Contractor for distribution.
  5. Informational Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies to the Contractor for distribution.
  6. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using facsimile of sample form included in Project Manual transmittal form.
- E. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- 1.5 SUBMITTAL PROCEDURES
- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
  2. Paper: Prepare submittals in paper form, and deliver to Architect.
- 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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- E. 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.

- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## 1.6 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable. Submittals with multiple products without job specific products marked as being provided for the project will be rejected. Products proposed for the project MUST be specifically marked in the submittals.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams that show factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  - 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. 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 unless submittal based on Architect's digital data drawing files is otherwise permitted.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
  - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.

- d. Sample source.
  - e. Number and title of applicable Specification Section.
  - f. Specification paragraph number and generic name of each item.
3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
  4. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
  5. 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.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  6. 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.
    - a. Number of Samples: Submit one full set(s) 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.
  7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect will return two copies to the Contractor for distribution. Contractor to mark up and retain one returned Sample set as a project record Sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units (of the five sets required) that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a

notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports 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 in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. 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.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are insufficient to perform services or certification required, submit a

written request for additional information to Architect.

- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and five paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
    - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- 1.8 CONTRACTOR'S REVIEW
- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
  - B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
    - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.
- 1.9 ARCHITECT'S 'S REVIEW
- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
    - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
    - 2. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
  - B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
  - C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
  - D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
  - E. Architect will return without review submittals received from sources other than Contractor. Submittals not required by the Contract Documents will be returned by Architect without action.

## **SECTION 016000 - PRODUCT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

#### **1.3 DEFINITIONS**

- A. Products: Items obtained 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.
  - 1. 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.

2. 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.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process 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.

- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

#### 1.4 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures." PART 2 -

#### PRODUCTS

##### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, 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. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
  - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

## **SECTION 024119 - SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  1. Demolition and removal of selected portions of building or structure.
  2. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
  1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  2. Section 017300 "Execution" for cutting and patching procedures.

#### **1.3 DEFINITIONS**

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

#### **1.4 MATERIALS OWNERSHIP**

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For refrigerant recovery technician.
- B. 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 Owner's building manager's and other tenants' on-site operations are uninterrupted.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Use of elevator and stairs.
  5. Coordination of Owner's continuing occupancy of portions of existing building and of

Owner's partial occupancy of completed Work.

- C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.
  - D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.
- 1.6 CLOSEOUT SUBMITTALS
- A. Inventory: Submit a list of items that have been removed and salvaged.
- 1.7 FIELD CONDITIONS
- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
  - B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
  - D. Hazardous Materials: If present in building and structure are not in Contract.
    - 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
    - 2. Owner will provide material safety data sheets as needed for suspected hazardous materials that are known to be present in buildings and structures if demolition is required because of building operations or processes performed there.
  - E. Storage or sale of removed items or materials on-site is not permitted.
  - F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
    - 1. Maintain fire-protection facilities in service during selective demolition operations.
- 1.8 WARRANTY
- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.
  - B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.
- 1.9 COORDINATION
- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.
- PART 2 - PRODUCTS
- 2.1 PERFORMANCE REQUIREMENTS
- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
  - B. Standards: Comply with ASSE A10.6 and NFPA 241. PART 3 -
- EXECUTION
- 3.1 EXAMINATION
- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
  - B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
  - C. Perform an engineering survey of condition of building to determine whether removing any



element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
  1. Comply with requirements specified in Section 013233 "Photographic Documentation."
  2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
  3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  2. Arrange to shut off utilities with utility companies.
  3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place

### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and

damage to structure and interior areas.

3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

#### 3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. 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. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

B. 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.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS
- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
  - B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
  - C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
  - D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
  - E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- 3.6 DISPOSAL OF DEMOLISHED MATERIALS
- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
    1. Do not allow demolished materials to accumulate on-site.
    2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
    3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
    4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
  - B. Burning: Do not burn demolished materials.
- 3.7 CLEANING
- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

**SECTION 072100 - THERMAL INSULATION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- |   |                                 |
|---|---------------------------------|
| <ol style="list-style-type: none"> <li>1. Glass-fiber blanket.</li> </ol>   | <p>A. Section Includes:</p>     |
| <ol style="list-style-type: none"> <li>1. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.</li> </ol> | <p>B. Related Requirements:</p> |

### 1.3 ACTION SUBMITTALS

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

### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
  1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
  2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
  3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

## PART 2 - PRODUCTS

### 2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Extruded Polystyrene Board (for limited use in walls where shown on Drawings): ASTM C 578, Type IV, thermal resistance (R-Value) for 1-inch thickness of 5.0 deg. F x h x sq. ft./Btu at 75 deg. F, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. DiversiFoam Products.
    - b. Dow Chemical Company (The).
    - c. Owens Corning.
  2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
  3. Thickness: as noted on Drawings.
- B. Extruded Polystyrene Board – (3 in 1) Insulation, Sheathing, Vapor Barrier, and Flashing System (for use in walls where shown on Drawings as **Alternate Bid**): ASTM C 578, Type IV, thermal resistance (R-Value) for 1-inch thickness of 5.6 deg. F x h x sq. ft./Btu at 75 deg. F, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Dow Chemical Company (The), CavityMate Ultra Air Barrier Wall System or approved equal.
  2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
  3. Thickness: as noted on Drawings.
  4. Provide Complete System; Provide Great Suff Pro spray foam to seal all panel joints, penetrations, gaps, around doors and windows, etc. as recommended by manufacturer for system. Provide spray adhesives as recommended by manufacturer. Provide all membrane flashings and tapes as shown on Drawings and as recommended by manufacturer. Provide any primers and liquid flashings as required by manufacturers recommendations. Provide all thermal barriers at window and door openings, floor levels, etc. to meet NFPA 285 requirements as recommended by manufacturer.
- C. Extruded Polystyrene Board (under slab insulation): ASTM C 578, Type VI, thermal resistance (R-Value) for 1-inch thickness of 5.0 deg. F x h x sq. ft./Btu at 75 deg. F, 40-psi minimum compressive strength; unfaced; maximum flame-spread and

smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. DiversiFoam Products.
  - b. Dow Chemical Company (The).
  - c. Owens Corning.

2. Thickness: as noted on Drawings.

D. Extruded Polystyrene Board, Type VI, Drainage Panels DP-1: ASTM C 578, Type VI, thermal resistance (R-Value) for 1-inch thickness of 5.0 deg. F x h x sq. ft./Btu at 75 deg. F, 40-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. DiversiFoam Products.
  - b. Dow Chemical Company (The).
  - c. Owens Corning.

2. Thickness: as noted on Drawings.

## 2.2 GLASS-FIBER BLANKET

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

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Owens Corning.

B. Glass-Fiber Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

1. Thickness and R-Value: as noted on Drawings.

## 2.3 INSULATION VAPOR BARRIER TAPE

A. Foil-Faced Tape: Provide manufacturer's standard tape compatible with insulation used. At a minimum foil-face tape to meet the following requirements; 3.25 mils, adhesion (peel) 96 oz/inch width, adhesion (shear) 2.2 psi, tensile 27 lbs/inch width, elongation 4.4 %, 0.03 emittance, WVTP 0.02 perms, flame spread (ASTM E84) 5, and smoke development (ASTM E84) 10.

B. Tape all joints and penetrations to produce a continuous vapor barrier.

## 2.4 MINERAL-WOOL BLANKETS

A. Recycled Content of Insulation: Postconsumer recycled content plus one-half of preconsumer recycled content not less than t percent.

B. Mineral-Wool Blanket, Unfaced : ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

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

- a. Roxul Inc.
- b. Thermafiber Inc.; an Owens Corning company.
- c. Johns Manville

## 2.5 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
  - 1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - 2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.
- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
  - 1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
    - a. Ceiling plenums.
    - b. Attic spaces.
    - c. Where indicated.
- C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

## 2.6 ACCESSORIES

- A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

### 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

### 3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
  - 1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
  - 1. If not otherwise indicated, extend insulation a minimum of 24 inches in from exterior walls.

### 3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
  - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according

to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.

2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

### 3.5 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

### 3.6 INSTALLATION OF CURTAIN-WALL INSULATION

A. Install board insulation in curtain-wall construction according to curtain-wall manufacturer's written instructions.

1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated on Drawings between insulation and glass.
2. Install insulation to fit snugly without bowing.

### 3.7 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
  - a. Exterior Walls: Set units with facing placed toward interior of construction.
  - b. Interior Walls: Set units with facing placed toward areas of high humidity.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

### 3.8 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and

cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

## **SECTION 079200 - JOINT SEALANTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  1. Nonstaining silicone joint sealants.
  2. Urethane joint sealants.
  3. Mildew-resistant joint sealants.
  4. Butyl joint sealants.
  5. Latex joint sealants.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product.
- B. Joint-Sealant Schedule: Include the following information:
  1. Joint-sealant application, joint location, and designation.
  2. Joint-sealant manufacturer and product name.
  3. Joint-sealant formulation.
  4. Joint-sealant color.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

#### **1.6 FIELD CONDITIONS**

- A. Do not proceed with installation of joint sealants under the following conditions:
  1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

#### **1.7 WARRANTY**

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants



from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 NONSTAINING SILICONE JOINT SEALANTS

- A. **SJS-1:** Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pecora Corporation.
    - b. Tremco Incorporated; Spectrem 1.
    - c. Dow Corning Corporation; 790. d. GE 2700.
- B. **SJS-2:** Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 795.
    - b. GE Construction Sealants; Momentive Performance Materials Inc; SilPruf NB.
    - c. Pecora Corporation; 864NST.
    - d. Tremco Incorporated; Spectrem 2.

### 2.2 URETHANE JOINT SEALANTS

- A. **UJS -1:** Urethane, S, P, 35, T, NT: Single-component, pourable, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 35, Uses T and NT.
  1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Bostik, Inc.; Chem-Calk 955-SL.
    - b. Tremco Incorporated.
    - c. Pecora Corporation.
- B. **UJS-2:** Urethane, M, NS, 50, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Use NT.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Pecora Corporation; Dynatrol II.
    - b. Bostik, Inc.
    - c. Tremco Incorporated.

### 2.3 MILDEW-RESISTANT JOINT SEALANTS

- A. **MRJS-1:** Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 786-M White.
    - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700

Sanitary.

- c. Tremco Incorporated; Tremsil 200.

#### 2.4 BUTYL JOINT SEALANTS

- A. **BJS-1:** Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

- 1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Bostik, Inc.; Chem-Calk 300.
  - b. Pecora Corporation; BC-158.
  - c. Tremco Incorporated.

#### 2.5 LATEX JOINT SEALANTS

- A. **AJS-1:** Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

- 1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Pecora Corporation; AC-20.
  - b. Tremco Incorporated; Tremflex 834.
  - c. Bostik, Inc.

#### 2.6 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

#### 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint

sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
  - a. Concrete.
  - b. Masonry.
  - c. Unglazed surfaces of ceramic tile.
  - d. Exterior insulation and finish systems.
  - e. Insert other porous joint substrate.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
  - a. Metal.
  - b. Glass.
  - c. Porcelain enamel.
  - d. Glazed surfaces of ceramic tile.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form

smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide flush joint profile locations indicated on Drawings according to Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.
  - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

### 3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces **UJS-2**.

1. Joint Locations:
  - a. Isolation and contraction joints in cast-in-place concrete slabs.
  - b. Joints between plant-precast architectural concrete paving units.
  - c. Tile control and expansion joints.
  - d. Joints between different materials listed above.
  - e. Insert other joints.
  - f. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, M, P, 50, T, NT.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces **SJS-1**.

1. Joint Locations:
  - a. Construction joints in cast-in-place concrete.
  - b. Joints between plant-precast architectural concrete units.
  - c. Control and expansion joints in unit masonry.
  - d. Joints in dimension stone cladding.
  - e. Joints between metal panels.
  - f. Joints between different materials listed above.
  - g. Perimeter joints between materials listed above and frames of doors/windows and louvers.
  - h. Control and expansion joints in ceilings and other overhead surfaces.

- i. Insert other joints.
    - j. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Silicone, nonstaining, S, NS, 100/50, NT.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces **UJS-1**.
  - 1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in tile flooring.
    - c. Insert other joints.
    - d. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Urethane, S, P, 25, T, NT.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces **SJS-2**.
  - 1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Tile control and expansion joints.
    - c. Vertical joints on exposed surfaces of unit masonry walls and partitions.
    - d. Insert other joints.
    - e. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Silicone, S, NS, 50, NT, G, A, and O, SWRI validation..
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement **AJS-1**.
  - 1. Joint Locations:
    - a. Perimeter joints between interior wall surfaces and frames of interior doors and elevator entrances.
    - b. Insert other joints.
    - c. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Siliconized Acrylic Latex, ASTM C 834, Type OP, Grade NF.t.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces **MRJS-1**.
  - 1. Joint Locations:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Insert other joints.
    - d. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Concealed mastics **BJS-1**.
  - 1. Joint Locations:
    - a. Aluminum thresholds.
    - b. Sill plates.
    - c. Insert other joints.
    - d. Other joints as indicated on Drawings.
  - 2. Joint Sealant: Butyl-rubber based.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

## **SECTION 081113 - HOLLOW METAL DOORS AND FRAMES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes hollow-metal work.
- B. Related Requirements:
  - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

#### **1.3 DEFINITIONS**

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### **1.4 COORDINATION**

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door type.
  - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Locations of reinforcement and preparations for hardware.
  - 5. Details of each different wall opening condition.
  - 6. Details of anchorages, joints, field splices, and connections.
  - 7. Details of accessories.
  - 8. Details of moldings, removable stops, and glazing.
  - 9. Details of conduit and preparations for power, signal, and control systems.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification:
  - 1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
  - 2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
    - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
    - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.
- E. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

#### **1.6 INFORMATIONAL SUBMITTALS**

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding

limitations of labeled assemblies.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Amweld International, LLC.
  - 2. Ceco Door; ASSA ABLOY.
  - 3. Curries Company; ASSA ABLOY.
  - 4. Steelcraft; an Ingersoll-Rand company.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

#### 2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings[ and temperature-rise limits] indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

#### 2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. At locations indicated in the Door and Frame Schedule.
  - 1. Frames:
    - a. Construction: Full profile welded.

#### 2.4 BORROWED LITES

- A. Hollow-metal frames of uncoated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Full profile welded.

#### 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

## 2.6 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
  1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Glazing: Comply with requirements in Section 088000 "Glazing."
- H. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
  2. Fire Door Cores: As required to provide fire-protection[ and temperature-rise] ratings indicated.
  3. Vertical Edges for Single-Acting Doors: Provide beveled or square edges at manufacturer's discretion.
  4. Top Edge Closures: Close top edges of doors with inverted closures of same material as face sheets.
  5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
  6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal



as frames.

1. Sidelite Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
  5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
  7. Terminated Stops: Terminate stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 2.9 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
  1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
  2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.
  3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
  1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations,

field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

- c. Install frames with removable stops located on secure side of opening.
  - d. Install door silencers in frames before grouting.
  - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
  - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
  6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
  8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:
  - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
  - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
  - c. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.
  - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

### 3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace

- defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

**SECTION 081416 - FLUSH WOOD DOORS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  1. Solid-core doors with wood-veneer faces.
  2. Factory finishing flush wood doors.
  3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
  1. Section 088000 "Glazing" for glass view panels in flush wood doors.
  2. Section 081113 "Hollow Metal Doors and Frames" for hollow metal frames.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
  1. Dimensions and locations of blocking.
  2. Dimensions and locations of mortises and holes for hardware.
  3. Dimensions and locations of cutouts.
  4. Undercuts.
  5. Requirements for veneer matching.
  6. Doors to be factory finished and finish requirements.
  7. Fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
  1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
  2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
    - a. Provide Samples for each species of veneer and solid lumber required.
    - b. Provide Samples for each color, texture, and pattern of plastic laminate required.
    - c. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by

an FSC-accredited certification body.

- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Algoma Hardwoods, Inc.
  2. Eggers Industries.
  3. Graham Wood Doors; an Assa Abloy Group company.
  4. Mohawk Doors; a Masonite company.
  5. VT Industries, Inc.

#### 2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
  1. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- C. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
- D. WDMA I.S.1-A Performance Grade:
- E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
  1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
  2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
  3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  4. Pairs: Provide formed-steel edges and astragals with intumescent seals.
    - a. Finish steel edges and astragals with baked enamel same color as doors.
- F. Mineral-Core Doors:
  1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
  2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:

- a. 5-inch top-rail blocking.
  - b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
  - c. 5-inch midrail blocking, in doors indicated to have armor plates.
  - d. 5-inch midrail blocking, in doors indicated to have exit devices.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
    - a. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

## 2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

### A. Interior Solid-Core Doors SCW:

1. Grade: Custom (Grade A faces).
2. Species: Match existing.
3. Cut: Plain sliced (flat sliced).
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
8. Core: Particleboard or Either glued wood stave or structural composite lumber.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
10. Construction: Seven plies, either bonded or nonbonded construction.
11. WDMA I.S.1-A Performance Grade: Extra Heavy Duty .

## 2.4 LIGHT FRAMES AND LOUVERS

### A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

### B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

## 2.5 FABRICATION

### A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements 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, BHMA-156.115-W, and hardware templates.

1. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

### C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

- D. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
  - 3. Louvers: Factory install louvers in prepared openings.
- 2.6 FACTORY FINISHING
  - A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
    - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
  - B. Factory finish doors.
  - C. Transparent Finish:
    - 1. Grade: Premium.
    - 2. Finish: WDMA TR-6 catalyzed polyurethane.
    - 3. Staining: Match existing doors.
    - 4. Effect: Semi-filled finish, produced by applying an additional finish coat to partially fill the wood pores.
    - 5. Sheen: Satin.

**PART 3 - EXECUTION**

- 3.1 EXAMINATION
  - A. Examine doors and installed door frames, with Installer present, before hanging doors.
    - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
    - 2. Reject doors with defects.
  - B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 INSTALLATION
  - A. Hardware: For installation, see Section 087100 "Door Hardware."
  - B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
    - 1. Install fire-rated doors 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
  - A. Operation: Rehang or replace doors that do not swing or operate freely.
  - B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

**SECTION 087100 – DOOR HARDWARE**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes:
  - 1. Mechanical and electrified door hardware for:
    - a. Swinging doors.

2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
- B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
  1. Windows
  2. Cabinets (casework), including locks in cabinets
  3. Signage
  4. Toilet accessories
  5. Overhead doors
- C. Related Sections:
  1. Division 08 Section "Hollow Metal Doors and Frames"
  2. Division 08 Section "Flush Wood Doors"

### 1.3 REFERENCES

- A. Fire/Life Safety
  1. NFPA - National Fire Protection Association
    - a. NFPA 70 – National Electric Code
    - b. NFPA 80 - Standard for Fire Doors and Fire Windows
    - c. NFPA 101 - Life Safety Code
    - d. NFPA 105 - Smoke and Draft Control Door Assemblies
  2. Ohio Building Code (OBC)
  3. All applicable State and Local Building Codes.
- B. UL - Underwriters Laboratories
  1. UL 10B - Fire Test of Door Assemblies
  2. UL 10C - Positive Pressure Test of Fire Door Assemblies
  3. UL 1784 - Air Leakage Tests of Door Assemblies
  4. UL 305 - Panic Hardware
- C. Accessibility
  1. ADA - Americans with Disabilities Act.
  2. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- D. DHI - Door and Hardware Institute
  1. Sequence and Format for the Hardware Schedule
  2. Recommended Locations for Builders Hardware
  3. Key Systems and Nomenclature
- E. ANSI - American National Standards Institute
  1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

### 1.4 SUBMITTALS

- A. General:
  1. Submit in accordance with Conditions of Contract and Division 01 requirements.
  2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
  3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.
- B. Action Submittals:
  1. Product Data: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.



2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
  - a. Wiring Diagrams: For power, signal, and control wiring and including:
    - 1) Details of interface of electrified door hardware and building safety and security systems.
    - 2) Schematic diagram of systems that interface with electrified door hardware.
    - 3) Point-to-point wiring.
    - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
  - a. Samples will be returned to supplier in like-new condition. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
  - a. Door Index; include door number, heading number, and Architects hardware set number.
  - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
  - c. Type, style, function, size, and finish of each hardware item.
  - d. Name and manufacturer of each item.
  - e. Fastenings and other pertinent information.
  - f. Location of each hardware set cross-referenced to indications on Drawings.
  - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
  - h. Mounting locations for hardware.
  - i. Door and frame sizes and materials.
  - j. Name and phone number for local manufacturer's representative for each product.
  - k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include how door will operate on egress, ingress, and fire and smoke alarm connection.
    - 1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
5. Key Schedule:
  - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
  - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
  - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
  - d. Index keying schedule by door number, keyset, hardware heading number, cross

- keying instructions, and special key stamping instructions.
  - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
    - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
  - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.
- C. Informational Submittals:
1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
  2. Product Certificates for electrified door hardware, signed by manufacturer:
    - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
  3. Certificates of Compliance:
    - a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
    - b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
    - c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.
  4. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.
  5. Warranty: Special warranty specified in this Section.
- D. Closeout Submittals:
1. Operations and Maintenance Data : Provide in accordance with Division 01 and include:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Name, address, and phone number of local representative for each manufacturer.
    - d. Parts list for each product.
    - e. Final approved hardware schedule, edited to reflect conditions as-installed.
    - f. Final keying schedule
    - g. Copies of floor plans with keying nomenclature
    - h. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
    - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

## 1.5 QUALITY ASSURANCE

- A. Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.
1. Where specific manufacturer's product is named and accompanied by "No Substitute," including make or model number or other designation, provide product specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
    - a. Where no additional products or manufacturers are listed in product category,

- requirements for “No Substitute” govern product selection.
2. Where products indicate “acceptable manufacturers” or “acceptable manufacturers and products”, provide product from specified manufacturers, subject to compliance with specified requirements and “Single Source Responsibility” requirements stated herein.
- B. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
1. Warehousing Facilities: In Project's vicinity.
  2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
  4. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
    - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- C. Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.
- D. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC).
  2. Can provide installation and technical data to Architect and other related subcontractors.
  3. Can inspect and verify components are in working order upon completion of installation.
  4. Capable of producing wiring diagrams.
  5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.
- E. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
  2. Manufacturers that perform electrical modifications and that are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- F. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- G. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
- H. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing

- agency acceptable to authorities having jurisdiction.
- I. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.
  - J. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
    1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist and that operate with force of not more than 5 lbf (22.2 N).
    2. Maximum opening-force requirements:
      - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
      - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
      - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
    3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
    4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.
  - K. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01.
    1. Attendees: Owner, Contractor, Architect, Installer, Owner's security consultant and Supplier's Architectural Hardware Consultant.
    2. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      - b. Preliminary key system schematic diagram.
      - c. Requirements for key control system.
      - d. Requirements for access control.
      - e. Address for delivery of keys.
  - L. Pre-installation Conference: Conduct conference at project site.
    1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    2. Inspect and discuss preparatory work performed by other trades.
    3. Inspect and discuss electrical roughing-in for electrified door hardware.
    4. Review sequence of operation for each type of electrified door hardware.
    5. Review required testing, inspecting, and certifying procedures.
  - M. Coordination Conferences:
    1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
      - a. Attendees: Door hardware supplier, door hardware installer, Contractor.
      - b. After meeting, provide letter of compliance to Architect, indicating when meeting was held and who was in attendance.
    2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.
      - a. Attendees: electrified door hardware supplier, doors and frames supplier, electrified door hardware installer, electrical subcontractor, Owner, Owner's security consultant, Architect and Contractor.
      - b. After meeting, provide letter of compliance to Architect, indicating when coordination conference was held and who was in attendance.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
  - 1. Deliver each article of hardware in manufacturer's original packaging.
- C. Project Conditions:
  - 1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
  - 2. Provide secure lock-up for door hardware delivered to Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Protection and Damage:
  - 1. Promptly replace products damaged during shipping.
  - 2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
  - 3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

## 1.7 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.
- F. Direct shipments not permitted, unless approved by Contractor.

## 1.8 WARRANTY

- A. Special Warranty: Provide warranties from the hardware manufacturers as follows: If manufacturer's standard published warranty meets these specifications, then no other documentation is required other than the standard written warranty. However, if the manufacturers' standard warranty does not meet these specifications, a written letter from the manufacturer on their letterhead agreeing to extend the standard warranty to meet the specified warranty must accompany the hardware submittals and cut sheets for the specified product.
  - 1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
    - a. Architectural Hinges:
      - 1) Mechanical: 1 year.
      - 2) Electrical: 1 year.
    - b. Locksets:
      - 1) Mechanical: 7 years.

- 2) Electrified: 1 year.
  - c. Exit Devices:
    - 1) Mechanical: 3 years.
    - 2) Electrified: 1 year.
  - d. Closers:
    - 1) Mechanical: 10 years.
    - 2) Electrified: 2 years.
  - e. Automatic Operators: 2 years.
  - f. Balance of Hardware: 1 year.
2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.9 MAINTENANCE

A. Maintenance Tools:

- 1. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and particular project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

- 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

Item	Scheduled Manufacturer	Acceptable Manufacturer
Hinges	Ives (IVE)	Hager, McKinney
Continuous Hinges	Ives (IVE)	Hager, McKinney
Electric Power Transfers	Von Duprin (VON)	Owners Standard - No Substitutions
Flush Bolts & Coordinators	Ives (IVE)	Hager, Rockwood
Locksets	Schlage (SCH)	Best, Sargent
Cylinders/Cores/Keying	Schlage (SCH) - Everest D	Owners Standard - No Substitutions
Exit Devices	Von Duprin	Precision, Sargent
Electric Strikes	Von Duprin	Folger Adams, HES
Power Supplies	Von Duprin	Precision, Sargent
Door Closers	LCN	Sargent, Stanley
Auto Operators	LCN	Owners Standard - No Substitutions
Door Trim	Ives (IVE)	Hager, Rockwood
Protection Plates	Ives (IVE)	Hager, Rockwood
Overhead Stops	Glynn-Johnson (GLY)	Rixson, ABH
Stops & Holders	Ives (IVE)	Hager, Rockwood
Magnetic Wall Holders	LCN	Rixson, ABH
Silencers	Ives (IVE)	Hager, Rockwood
Weatherstrip/Gasketing	Zero (ZER)	Hager, NGP, Pemko

Key Cabinets	Lund (LUN)	HPC, Telkee
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- D. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- E. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

## 2.2 MATERIALS

### A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

### B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

### C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

## 2.3 HINGES

### A. Provide three-knuckle, ball bearing hinges.

1. Manufacturers and Products:
  - a. Scheduled Manufacturer and Product: Ives 5BB1 series
  - b. Acceptable Manufacturers and Products: Hager BB series, McKinney TB/T4B series,

### B. Requirements:

1. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
  - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
  - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
2. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
  - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
  - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
3. 2 inches or thicker doors:
  - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
  - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
4. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
5. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.

6. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Steel Hinges: Steel pins
  - b. Non-Ferrous Hinges: Stainless steel pins
  - c. Out-Swinging Exterior Doors: Non-removable pins
  - d. Out-Swinging Interior Lockable Doors: Non-removable pins
  - e. Interior Non-lockable Doors: Non-rising pins
7. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening. Doors 36 inches (914 mm) wide or less furnish hinges 4-1/2 inches (114 mm) high; doors greater than 36 inches (914 mm) wide furnish hinges 5 inches (127 mm) high, heavy weight or standard weight as specified.
8. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
9. Provide mortar guard for each electrified hinge specified, unless specified in hollow metal frame specification.
10. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

#### 2.4 CONTINUOUS HINGES

##### A. Aluminum Geared

1. Manufacturers:
  - a. Scheduled Manufacturer: Ives 112HD/224HD
  - b. Acceptable Manufacturers: Hager 780-112H/780-224HD , McKinney MCK-12HD /MCK-25HD
2. Requirements:
  - a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.25, Grade 2.
  - b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum, with 0.25-inch (6 mm) diameter Teflon coated stainless steel hinge pin.
  - c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
  - d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
  - e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
  - f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
  - g. Install hinges with fasteners supplied by manufacturer.
  - h. Provide hinges with symmetrical hole pattern.

#### 2.5 ELECTRIC POWER TRANSFER

##### A. Manufacturers:

- a. Scheduled Manufacturer: Von Duprin - EPT10 Series - Owners Standard - No Substitutions.

- B. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified



hardware.

- C. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

## 2.6 FLUSH BOLTS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Hager, Rockwood

### B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust- proof strikes at each bottom flush bolt.

## 2.7 COORDINATORS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Hager, Rockwood

### B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes.

Factory-prep coordinators for vertical rod devices if required.

## 2.8 MORTISE LOCKS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage L9000 series
2. Acceptable Manufacturers and Products: Best 45H series, Sargent 8200 series

### B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
2. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
4. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide a request to exit (RX) switch that is actuated with rotation of inside lever.
5. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
  - a. Lever Design: Schlage 06A.
  - b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

## 2.9 EXIT DEVICES

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Von Duprin 98 series
2. Acceptable Manufacturers and Products: Precision Apex series, Sargent 80 series.

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit or Fire Exit Hardware. Cylinders: Refer to "KEYING" article, herein.
2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
3. Touchpad: Extend minimum of one half of door width. Match exit device finish, stainless steel for US26, US26D, US28, US32, and US32D finishes; and for all other finishes, provide compatible finish to exit device. Provide compression springs in devices, latches, and outside trims or controls; tension springs also acceptable.
4. Provide exit devices with dead-latching feature for security and for future addition of alarm kits and/or other electrified requirements.
5. Provide exit devices with manufacturer's approved strikes.
6. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
7. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
8. Provide cylinder dogging at non-fire-rated exit devices, unless specified less dogging.
9. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion that is removed by use of a keyed cylinder, which is self-locking when re-installed.
10. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
  - a. Lever Style: Match lever style of locksets.
  - b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.
11. Provide UL labeled fire exit hardware for fire rated openings.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.

## 2.10 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Von Duprin 6000 series
2. Acceptable Manufacturers and Products: Folger Adam 300 series, HES 1006 series

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary-resistant.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide fail-secure type electric strikes, unless specified otherwise.
5. Coordinate voltage and provide transformers and rectifiers for each strike as required.

## 2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage or Von Duprin PS900 series
2. Acceptable Manufacturers and Products: Precision ELR series, Sargent 3500 series

B. Requirements:

1. Provide power supplies, recommended and approved by manufacturer of electrified locking component, for operation of electrified locks, electrified exit devices, magnetic locks, electric strikes, and other components requiring power supply.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply , and UL class 2 listed.
4. Options:
  - a. Provide power supply, where specified, with internal capability of charging sealed backup batteries 24 VDC, in addition to operating DC load.
  - b. Provide sealed batteries for battery back-up at each power supply where specified.
  - c. Provide keyed power supply cabinet.
5. Provide power supply in an enclosure, complete, and requiring 120VAC to fused input.
6. Provide power supply with emergency release terminals, where specified, that allow release of all devices upon activation of fire alarm system complete with fire alarm input for initiating “no delay” exiting mode.

#### 2.12 CYLINDERS

- A. Manufacturer:
  1. Scheduled Manufacturer: Schlage “Everest D”, Owner’s District Wide Standard, NO SUBSTITUTIONS.
- B. Requirements: Provide cylinders/cores complying with the following requirements.
  1. Cylinders/cores compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer’s series as indicated.
- C. Full-sized cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
  1. Conventional cylinder with Large Format Interchangeable Core (LFIC) with Everest D keyway compatible with owner’s district wide existing key system.
  2. Manufacturer-keyed permanent cylinders/cores, configured into existing keying system per “KEYING” article herein.
  3. Features: Cylinders/cores shall incorporate the following features.
- D. Nickel silver bottom pins.
  1. Identification:
- E. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication “Keying Systems and Nomenclature” for identification. Blind code marks shall not include actual key cuts.
- F. Identification stamping provisions must be approved by the Architect and Owner.
- G. Failure to comply with stamping requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.
  1. Forward cylinders/cores to Owner, separately from keys, by means as directed by Owner.
- H. Replaceable Construction Cores.
  1. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
  2. Owner or Owner’s Representative will replace temporary construction cores with permanent cores.

#### 2.13 KEYING

- A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
  - 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
    - a. Keying system as directed by the Owner.
  - 2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.
  - 3. Provide keys with the following features.
    - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
  - 4. Identification:
    - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
    - b. Identification stamping provisions must be approved by the Architect and Owner.
    - c. Stamp keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the Facility Code and Patent Number to enforce the patent protection.
    - d. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to Owner.
    - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
  - 5. Quantity: Furnish in the following quantities.
    - a. Change (Day) Keys: Two (2) per cylinder/core.
    - b. Permanent Control Keys: Two (2)
    - c. Top Level Master Keys: One (1)
    - d. Master or Grandmaster Keys per master group: One (1)
    - e. Temporary Construction Keys: Two (2)
    - f. Temporary Construction Control Keys: Two (2)
    - g. Blank Keys: Eight (8)
    - h. Coordinate through The Office of the CMSD Locksmith.

#### 2.14 KEY CONTROL SYSTEM

- A. Manufacturers:
  - 1. Scheduled Manufacturer: Lund
  - 2. Acceptable Manufacturers: HPC, Telkee
- B. Requirements:
  - 1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers.

#### 2.15 KEY MANAGEMENT SOFTWARE

- A. Manufacturers and Products:
  - 1. Scheduled Manufacturer and Product: Schlage - SITEMASTER 200
- B. Requirements:
  - 1. Software: Provide tracking, issuing, collecting and transferring information regarding keys. Provide customized query, reporting, searching capability, comprehensive location hardware listings, display key holder photos and signature for verification, and provide automatic reminders for maintenance, back-ups and overdue keys.
  - 2. Provide training for Owner's personnel on proper operation and application of key management software.

## 2.16 DOOR CLOSERS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4050 series
2. Acceptable Manufacturers and Products: Sargent 351 series, Stanley D4551 series.

### B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

## 2.17 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4600 series
2. Acceptable Manufacturers and Products: Owners Standard - No Substitutions.

### B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check valve, sweep valve, latch valve to control door.
6. Provide drop plates, brackets, or adapters for arms as required for details.
7. Provide hard-wired actuator switches for operation as specified.
8. Provide weather-resistant actuators at exterior applications.
9. Provide key switches with LED's, recommended and approved by manufacturer of automatic operator as required for function described in operation description of hardware group below. Cylinders: Refer to "KEYING" article, herein.
10. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence

operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.

11. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

#### 2.18 DOOR TRIM

##### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Hager, Rockwood

##### B. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

#### 2.19 PROTECTION PLATES

##### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Hager, Rockwood

##### B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
  - a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
  - b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
  - c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

#### 2.20 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

##### A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson
2. Acceptable Manufacturers: Rixson, ABH

##### B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.

3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

#### 2.21 DOOR STOPS AND HOLDERS

##### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Hager, Rockwood

##### B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

#### 2.22 WEATHER-STRIPPING, THRESHOLDS AND GASKETING

##### A. Manufacturers:

1. Scheduled Manufacturer: Zero International
2. Acceptable Manufacturers: Hager, National Guard Products, Pemko

##### B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size of thresholds:
  - a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
  - b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

#### 2.23 SILENCERS

##### A. Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Hager, Rockwood

##### B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

#### 2.24 MAGNETIC HOLDERS

##### A. Manufacturers:

1. Scheduled Manufacturer: LCN
2. Acceptable Manufacturers: Rixson, ABH

##### B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordination projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Wire

magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

## 2.25 FINISHES

- A. Finish: As specified in the hardware sets.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Existing Door and Frame Compatibility: Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected

### 3.2 PREPARATION

- A. Where on-site modification of doors and frames is required:
  - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
  - 2. Field modify and prepare existing door and frame for new hardware being installed.
  - 3. When modifications are exposed to view, use concealed fasteners, when possible.
  - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
    - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
    - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
    - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

### 3.3 INSTALLATION

- A. All hardware will be installed by qualified tradesmen, skilled in application of commercial grade hardware. A pre-installation meeting shall be conducted by the manufacturer's representative. The manufacturer's representative shall also conduct a post construction review of all doors as part of the punch list process.
- B. Mounting Heights: Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Custom Steel Doors and Frames: HMMA 831.
  - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.



- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- I. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- J. Lock Cylinders: Install construction cores to secure building and areas during construction period.
  - 1. Replace construction cores with permanent cores as indicated in keying section.
  - 2. Permanent cores will be supplied to owner and installed by the owners' representative.
- K. Wiring: Coordinate with Division 26 and Division 28 sections for:
  - 1. Conduit, junction boxes and wire pulls.
  - 2. Connections to and from power supplies to electrified hardware.
  - 3. Connections to fire/smoke alarm system and smoke evacuation system.
  - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
  - 5. Testing and labeling wires with Architect's opening number.
- L. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- M. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
- N. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
  - 1. Configuration: Provide power supplies as specified in the hardware sets.
- P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

### 3.4 FIELD QUALITY CONTROL

- A. Architectural Hardware Consultant: Engage qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
  - 1. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely

from an open position of 30 degrees.

2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. **Occupancy & Warranty Adjustments (Multiple):** Approximately Six (6) months and again at Eleven (11) months after date of Substantial Completion and just prior to the expiration of contractors one year warranty. The hardware installer accompanied by the installer's Architectural Hardware Consultant and or hardware factory representative shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

### 3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### 3.7 DEMONSTRATION

- A. Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

### 3.8 DOOR HARDWARE SCHEDULE

- A. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements. Contractor is to provide hardware sets, per the project notes and requirements for each door, then submit these sets in the shop drawing phase for review and approval.

END OF SECTION

## **SECTION 088000 - GLAZING**

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes:
  1. Doors.

#### 1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit

#### 1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches

square.

1. Tinted glass.
  2. Coated glass.
  3. Laminated glass.
  4. Insulating glass.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Shop Drawings: For glass. Show fabrication and installation details. Include the following:
1. Size and location of penetrations.
  2. Glazing method.
  3. Mounting method.
  4. Attachments to other work.
  5. Full-size details of edge-finished profiles.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- 1.6 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer manufacturers of insulating-glass units with sputter-coated, low-E coatings and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For tinted glass coated glass insulating glass and glazing sealants, for tests performed by a qualified testing agency.
1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.
- 1.7 QUALITY ASSURANCE
- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Source Limitations for Glass: Obtain tinted float glass, coated float glass, and insulating glass from single source from single manufacturer for each glass type.
- F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method. Source shall be the same as Security Glazing supplied under Section 088853.
- G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: GANA's "Glazing Manual."
  2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities

having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.
- J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

#### 1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
  - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
  - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
  - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
  - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

#### 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

#### 1.11 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in glass schedules or comparable product by one of the following:
  - 1. Cardinal Glass Industries.
  - 2. Guardian Industries Corp.; SunGuard.
  - 3. Viracon, Inc.
  - 4. Vitro.
  - 5. Oldcastle.
  - 6. Arch Aluminum and Glass.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
  - 1. Obtain tinted glass from single source from single manufacturer.
  - 2. Obtain reflective-coated glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
  - 1. Design Wind Pressures: As indicated on Drawings.
  - 2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
    - a. Wind Design Data: As indicated on Drawings.
    - b. Basic Wind Speed: 90 mph.
    - c. Importance Factor: 1.15.
    - d. Exposure Category: C.
  - 3. Design Snow Loads: As indicated on Drawings.
  - 4. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
  - 5. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
  - 6. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  2. For laminated-glass lites, properties are based on products of construction indicated in Security Glazing.
  3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

### 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  1. GANA Publications: "Glazing Manual."
  2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
  1. Minimum Glass Thickness for Exterior Lites: 6 mm.
  2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

### 2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- B. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
  1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- C. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.

### 2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
  - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
  - 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
  - 3. Desiccant: Molecular sieve or silica gel, or a blend of both.
- 2.6 FIRE-PROTECTION-RATED GLAZING TYPES
  - A. Glass Type FR-1: 45, 60, and 90-minute fire-rated glazing; laminated two plies of clear glazing complying with 16CFR1201 Category II.
    - 1. Basis of Design Product. Subject to compliance with requirements, provide SAFTI FIRST Fire Rated Glazing Solutions; Pyran Platinum L (laminated), or comparable product by one of the following:
      - a. Technical Glass Products, FireLite Plus TGP, laminated.
      - b. Vetrotech Saint-Gobain, Keralite L, Laminated.
- 2.7 GLAZING TAPES
  - A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
    - 1. AAMA 804.3 tape, where indicated.
    - 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
    - 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- 2.8 MISCELLANEOUS GLAZING MATERIALS
  - A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
  - B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
  - C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
  - D. Spacers: Elastomeric blocks or continuous extrusions of 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. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
  - G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.
- 2.9 FABRICATION OF GLAZING UNITS
  - A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
    - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
      - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners. PART 3 -

## EXECUTION

### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is



subjected to movement.

- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

#### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

#### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

#### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

#### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at

frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

### 3.8 MONOLITHIC GLASS SCHEDULE

A. Glass Type MGL-1: Clear heat-strengthened or fully tempered float glass.

1. Minimum Thickness: 6 mm.

2. Safety glazing where required by code.

END OF SECTION 088000

## **SECTION 092216 - NON-STRUCTURAL METAL FRAMING**

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.

2. Suspension systems for interior ceilings and soffits.

3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:

1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

#### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

#### 1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For embossed steel studs and runners firestop tracks, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Horizontal Deflection: For wall assemblies, limited to 1/240 at gypsum board assemblies and 1/360 at cementitious backer units of the wall height based on horizontal loading of 5 lbf/sq. ft. .

## 2.2 FRAMING SYSTEMS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized coating unless otherwise indicated.
- C. Studs and Runners: ASTM C 645. Use either steel studs and runners or embossed steel studs and runners.
  - 1. Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
    - b. Depth: As indicated on Drawings.
  - 2. Embossed Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
    - b. Depth: As indicated on Drawings.
- D. Slip-Type Head Joints: Where indicated, provide one of the following:
  - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  - 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
  - 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. Minimum Base-Metal Thickness: 0.0329 inch.
- G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: 1-1/2 inches.
  - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base-Metal Thickness: 0.0329 inch.
  - 2. Depth: 7/8 inch.
- I. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: Asymmetrical or hat shaped.
- J. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: 3/4 inch.
- K. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment

flange of 7/8 inch , minimum uncoated-metal thickness of 0.0179 inch , and depth required to fit insulation thickness indicated.

### 2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
  - 1. Depth: As indicated on Drawings.
- E. Furring Channels (Furring Members):
  - 1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
  - 2. Steel Studs and Runners: ASTM C 645.
    - a. Minimum Base-Metal Thickness: As indicated on Drawings.
    - b. Depth: As indicated on Drawings.
  - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    - a. Minimum Base-Metal Thickness: 0.0329 inch .
  - 4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
    - a. Configuration: Asymmetrical or hat shaped.
- F. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

### 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide the following:
  - 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
  - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
  - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary

for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

### 3.3 INSTALLATION, GENERAL

#### A. Installation Standard: ASTM C 754.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
  - a. Install two studs at each jamb unless otherwise indicated.
  - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
  - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
  - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

6. Curved Partitions:
  - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
  - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- E. Direct Furring:
  1. Screw to wood framing.
  2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:
  1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
  2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
  3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

### 3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  5. Do not attach hangers to steel roof deck.
  6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

## **SECTION 092900 - GYPSUM BOARD**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

##### A. Section Includes:

- 1. Interior gypsum board.

##### B. Related Requirements:

- 1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

#### 1.3 ACTION SUBMITTALS

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

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### **PART 2 - PRODUCTS**

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

#### 2.2 GYPSUM BOARD, GENERAL

- A. Materials: Products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

#### 2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C 1396/C 1396M.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the

following:

- a. Georgia-Pacific Building Products.
  - b. National Gypsum Company.
  - c. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Georgia-Pacific Building Products; LLC; Toughrock Fireguard Gypsum board..
    - b. National Gypsum Company; Gold Bond Fire-Shield Gypsum Board.
    - c. USG Corporation; Sheetrock Brand Firecode Core.
  2. Thickness: 5/8 inch .
  3. Long Edges: Tapered.
- C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Georgia-Pacific Building Products gypsum LLC; Toughrock Flexroc Gypsum Board.
    - b. National Gypsum Company; 1/4" High Flex Gypsum Board.
    - c. USG Corporation; Sheetrock Brand Flexible Gypsum Panels.
  2. Thickness: 1/4 inch .
  3. Long Edges: Tapered.
- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Georgia-Pacific Building Products; Toughrock CD Ceiling Board.
    - b. National Gypsum Company; High Strength Ceiling Board.
    - c. USG Corporation; Sheetrock Brand Sag-Resistant Gypsum Board.
  2. Thickness: 1/2 inch.
  3. Long Edges: Tapered.
- E. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
- a. Georgia-Pacific Building Products; DensArmor Plus Abuse-Resistant board.
  - b. National Gypsum Company; Gold Bond Hi Abuse XP.
  - c. USG Corporation; Sheetrock Mold Tough AR (Abuse Resistant).
2. Core: 5/8 inch, Type X.
  3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
  4. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
  5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
  6. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements according to test in Annex A1.
  7. Long Edges: Tapered.
  8. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- F. Impact-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
- a. Georgia-Pacific Building Products; DensArmor Plus Impact-Resistant board.
  - b. National Gypsum Company; Gold Bond Hi Impact XP.
  - c. USG Corporation; Sheetrock Mold Tough VHI (Impact Resistant).
2. Core: 5/8 inch, Type X.
  3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.



4. **Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.**
    5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
    6. Hard-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements according to test in Annex A1.
    7. Long Edges: Tapered.
    8. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  - G. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Georgia-Pacific Building Products; Toughrock Mold-Guard Guard Gypsum Board.
      - b. National Gypsum Company; XP Gypsum Board.
      - c. USG Corporation: Sheetrock Brand Mold tough Gypsum Panels.
    2. Core: 5/8 inch , Type X.
    3. Long Edges: Tapered.
    4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- 2.4 SPECIALTY GYPSUM BOARD
- A. Gypsum Board, Type C: ASTM C 1396/C 1396M. Manufactured to have increased fire-resistive capability.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Georgia-Pacific Building Products; Toughrock Fireguard C Gypsum Board.
      - b. National Gypsum Company; Gold Bond Fire-Shield C.
      - c. United States Gypsum Company; Sheetrock Brand Firecode C Core.
    2. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
    3. Long Edges: Tapered.
  - B. Gypsum Board, Shaft-Wall/Area Separation Wall:
    1. Products: Subject to compliance with requirements, provide one of the following:
      - a. Georgia-Pacific Gypsum LLC; DensGlass Ultra Shaftliner 1-inch.
      - b. National Gypsum Company; Gold Bond Fire-Shield Shaftliner 1-inch.
      - c. USG Corporation; Sheetrock Brand Gypsum Liner Panel 1-inch.
    2. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
    3. Long Edges: Tapered.
- 2.5 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS
- A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Georgia-Pacific Building Products; Toughrock Soffit Board.
      - b. National Gypsum Company; Goldbond Exterior Soffit Board.
      - c. United States Gypsum Company; Sheetrock Brand Exterior Ceiling Board.
    2. Core: 5/8 inch , Type X.
- 2.6 TILE BACKING PANELS
- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. CertainTeed Corporation; FiberCement Backerboard.
      - b. National Gypsum Company; Permabase Cement Board.
      - c. United States Gypsum Company; DUROCK Cement Board.

2. Thickness: 1/2 inch .
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM 3274.

## 2.7 TRIM ACCESSORIES

### A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
  - a. Cornerbead.
  - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - c. L-Bead: L-shaped; exposed long flange receives joint compound.
  - d. Expansion (control) joint.
  - e. Curved-Edge Cornerbead: With notched or flexible flanges.

### B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
2. Shapes:
  - a. Cornerbead.
  - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
  - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

## 2.8 JOINT TREATMENT MATERIALS

### A. General: Comply with ASTM C 475/C 475M.

### B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Fiber Glass.
3. Tile Backing Panels: As recommended by panel manufacturer.

### C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
  - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use compound per gypsum board manufacturer's written recommendations.
4. Finish Coat: For third coat, use compound per gypsum board manufacturer's written recommendations.
5. Skim Coat: For final coat of Level 5 finish, use compound or coating per gypsum board manufacturer's written recommendations.

### D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.

### E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

## 2.9 AUXILIARY MATERIALS

### A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

### B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

- C. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- A. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  2. Fit gypsum panels around ducts, pipes, and conduits.
  3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:

1. Type X: Where required for fire-resistance-rated assembly.
2. Flexible Type: As indicated on Drawings. Apply in double layer at curved assemblies.
3. Ceiling Type: Ceiling surfaces.
4. Abuse-Resistant Type: All vertical surfaces, unless otherwise indicated.
5. Impact-Resistant Type: As indicated on Drawings.
6. Mold-Resistant Type: All walls, ceilings scheduled for painted finish in toilet rooms, and other spaces subject to moisture or water.
7. Type C: Where required for specific fire-resistance-rated assembly indicated.

- B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

- C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

- D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

### 3.4 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.
2. Fasten with corrosion-resistant screws.

### 3.5 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

### 3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  1. Cornerbead: Use at outside corners unless otherwise indicated.
  2. LC-Bead: Use at exposed panel edges.
  3. L-Bead: Use where indicated.
  4. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
  1. Cornerbead: Use at outside corners.
  2. LC-Bead: Use at exposed panel edges.

### 3.7 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  2. Level 2: Panels that are substrate for tile.
  3. Level 3: Where indicated on Drawings.
  4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. **Primer and its application to surfaces are specified in Section 099123 "Interior Painting."**
  5. Level 5: Where indicated on Drawings.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.8 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy

surface contamination and discoloration.

END OF SECTION 092900

## **SECTION 095113 - ACOUSTICAL PANEL CEILINGS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Related Requirements:
  - 1. Section 095123 "Acoustical Tile Ceilings" for ceilings consisting of mineral-base acoustical tiles used with fully concealed suspension systems, stapling, or adhesive bonding.
  - 2. Section 095133 "Acoustical Metal Pan Ceilings" for ceilings consisting of metal-pan units with exposed and concealed suspension systems.
- C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

#### **1.2 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site to be attended by the installer, the architect, and the construction manager to review the specifications, and detail the materials, the installation, the initial maintenance, and protection of the installed ceiling.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For each acoustical panel ceiling suspension system, from ICC-ES.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For finishes to include in maintenance manuals.

#### **1.6 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed for each panel type specified.
  - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed for each type specified.
  - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.
  - 4. Impact Clips: Equal to 2 percent of quantity installed.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, 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.

#### **1.8 FIELD CONDITIONS**

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, 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. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Flame-Spread Index: Class A according to ASTM E1264.
  2. Smoke-Developed Index: 450 or less.
- C. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency.
  1. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL or from the listings of another qualified testing agency.

### 2.3 ACOUSTICAL PANELS

- A. Acoustical Panels: ACT-1 (classrooms, offices, support rooms)
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Armstrong World Industries, Inc.; Cirrus #574 (24 by 24 inch) and #533 (24 by 48 inch) Square Lay-in Item #1714.
    - b. CertainTeed Corp.; Celotex Brand Fine Fissured High NRC #HHF-497 DP.
    - c. USG Interiors, Inc.; Subsidiary of USG Corporation; Eclipse ClimaPlus, Square Lay-in Item #76575.
  2. Classification: Provide fire-resistance rated panels complying with ASTM E 1264 for type, form, and pattern as follows:
    - a. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
    - b. Pattern: CE (perforated, small holes and lightly textured).
  3. Color: White.
  4. LR: Not less than 0.85.
  5. NRC: Not less than 0.70.
  6. CAC: Not less than 35.
  7. Edge/Joint Detail: Square.
  8. Thickness: 3/4 inch.
  9. Modular Size: 24 by 48 inches and 24 by 24 inches, as indicated in Drawings.
  10. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21 (basis of design: Armstrong, Humiguard Plus).

### 2.4 METAL SUSPENSION SYSTEMS

- A. Suspension system for ACT-1.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Inc.; Prelude XL 15/16" Exposed Tee System.
    - b. CertainTeed Corporation.; 15/16" Classic System.

- c. USG Interiors, Inc.; Donn DX Exposed 15/16" Face Suspension System
- 2. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z90) coating designation, with prefinished, 15/16-inch- (24-mm-) wide, aluminum caps on flanges.
  - a. Structural Classification: Intermediate-duty system.
  - b. End Condition of Cross Runners: Override stepped or butt-edge type.
  - c. Face Design: Flat, flush.
  - d. Face Finish: Painted white.

## 2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops 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 according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
    - a. Type: Postinstalled expansion anchors.
    - b. Corrosion Protection, Carbon Steel: Components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.
    - c. Corrosion Protection, Stainless Steel: Components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.
    - d. Corrosion Protection, Nickel-Copper Alloy: Components fabricated from nickel-copper- alloy rods complying with ASTM B164 for UNS No. N04400 alloy.
  - 2. Power-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 according to ASTM E1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
  - 2. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
  - 3. Nickel-Copper-Alloy Wire: ASTM B164, nickel-copper-alloy UNS No. N04400.
  - 4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized- steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.
- F. Hold-Down Clips: Manufacturer's standard hold-down.
- G. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- H. Clean-Room Gasket System: Where indicated, provide manufacturer's standard system, including manufacturer's standard gasket and related adhesives, tapes, seals, and retention clips, designed to seal out foreign material from and maintain positive pressure in clean room.

## PART 3 - EXECUTION



### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

### 3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.
  - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- 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 and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 8. Do not attach hangers to steel deck tabs.
  - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

- 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. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
  - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
  - 1. Arrange directionally patterned acoustical panels as follows:
    - a. Install panels with pattern running in one direction parallel to long axis of space or as indicated in drawings.
  - 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  - 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  - 4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
  - 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  - 6. Install impact clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
    - a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
  - 7. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

#### 3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

#### 3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

### **SECTION 096513 - RESILIENT BASE AND ACCESSORIES**

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
    - 1. Thermoset-rubber base.
    - 2. Rubber stair accessories.
    - 3. Rubber molding accessories.
  - 1.2 ACTION SUBMITTALS
    - A. Product Data: For each type of product.
    - B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 2 inches long.
  - 1.3 MAINTENANCE MATERIAL SUBMITTALS
    - A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
      - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.
  - 1.4 QUALITY ASSURANCE
    - A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
      - 1. Coordinate mockups in this Section with mockups specified in other Sections.
      - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
      - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
    - B. Installation Qualification: Contractors for floor covering installation should be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified. An installer is "qualified" if trained by a certified International Standards and Training Alliance resilient floor covering installer.
  - 1.5 DELIVERY, STORAGE, AND HANDLING
    - A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 85 deg F.
  - 1.6 FIELD CONDITIONS
    - A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 degrees F or more than 85 degrees F, in spaces to receive resilient products during the following periods:
      - 1. 48 hours before installation.
      - 2. During installation.
      - 3. 48 hours after installation.
    - B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
    - C. Install resilient products after other finishing operations, including painting, have been completed.
- PART 2 - PRODUCTS**
- 2.1 PERFORMANCE REQUIREMENTS
    - A. Fire-Test-Response Characteristics: For resilient base and accessories, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
      - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
      - 2. ASTM E (Smoke Generation) Maximum Specific Optical Density of 450 or less.
  - 2.2 THERMOSET-RUBBER BASE (RB)
    - A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1. Flexco; Wallflowers Wall Base.

2. Johnsonite; A Tarkett Company; Baseworks Rubber Wall Base.
  3. Mannington Commercial: BurkeBase Type TS Wall Base.
  4. Mondo Contract Flooring; Wall Base.
  5. Nora Systems, Inc.; Nora Wall Base
  6. Roppe Corporation, U.S.A.; Pinnacle Wall Base.
- B. Product Standard: ASTM F 1861, Type TS (rubber, thermoset).
1. Group: I (solid, homogeneous).
  2. Style: B, Cove.
  3. Thickness: 0.125 inch.
  4. Height: 4 inches and 6 inches were indicated in drawings.
  5. Lengths: Coils in manufacturer's standard length, minimum 100 feet.
  6. Outside Corners: Job formed.
  7. Inside Corners: Job formed.
  8. Colors: As selected by Architect from full range of industry colors.
- 2.3 RUBBER STAIR ACCESSORIES (RTR)
- A. Manufacturers
1. Flexco, Corporation; Heavy Duty Radial II One-Piece Tread with Riser, with and without Visually Impaired Strip.
  2. Johnsonite, A Tarkett Company; Rubber Tread with Integrated Riser VIRTR.
  3. Mannington Commercial; ColorScape One-Step Stair Treads with and without Visually Impaired Strip.
  4. Nora Systems, Inc.; Norament Stair Tread with and without Visually Impaired Strip.
  5. Roppe Corporation, U.S. A.; Vantage Profile One-Piece Tread and Riser with and without Visually Impaired Strip.
- B. Stair Treads: ASTM F 2169.
1. Type: TS (rubber, vulcanized thermoset).
  2. Class: 2 (pattern: as selected by architect from manufacturer's full range of patterns and textures.)
  3. Group: 2 (with contrasting color for the visually impaired.)
  4. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
  5. Nosing Height: 1-1/2 - 2 inches.
  6. Thickness: 1/8 inch and tapered to the back edge.
  7. Size: Lengths and depths to fit each stair tread in one piece.
  8. Integral Risers: Smooth, flat; in height that fully covers substrate.
- C. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
- D. Locations: Provide rubber stair accessories in areas as indicated.
- E. Colors and Patterns: As selected by Architect from full range of industry colors (minimum 21).
- 2.4 VINYL MOLDING ACCESSORIES
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flexco, Corporation; Flooring Accessories.
  2. Johnsonite; A Tarkett Company; Specialty Flooring Finishing Accessories.
  3. Mannington Commercial; Vinyl Accessories.
  4. Roppe Corporation, U.S.A.; Vinyl Accessories.
- B. Description: Vinyl cap for cover resilient flooring, carpet edge for glue-down applications, nosing for carpet, nosing for resilient flooring, reducer strip for resilient flooring, joiner for tile and carpet, and transition strips.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide vinyl molding accessories in areas indicated.

- E. Colors: As selected by Architect from full range of industry colors.
- 2.5 INSTALLATION MATERIALS
- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
  - B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
    - 1. Adhesives shall have a VOC content of 50 g/L or less.
  - C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
  - D. Metal Edge Strips: of width shown, nominal 2 inches wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient

products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Use only manufacturer's recommended adhesive for installation.
- C. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- D. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- E. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- F. Do not stretch resilient base during installation.
- G. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- H. Preformed Corners: Install preformed corners before installing straight pieces.
- I. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
    - a. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
  - 3. Mitered corners are not acceptable.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
  - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
  - 2. Use only manufacturer's recommended adhesive for installation.
  - 3. Tightly adhere to substrates throughout length of each piece.
  - 4. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from surfaces. Follow manufacturer's instructions to avoid damage to flooring finish and accessory materials' finish.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Initial Maintenance for Rubber Tread and Riser Units: Remove soil, visible adhesive and surface blemishes from floor tile surfaces before performing manufacturer's recommended maintenance.
  - 1. Use commercially available product recommended by flooring manufacturer.
  - 2. Remove silicone finish with a diluted pH neutral cleaner/degreaser using flooring and solution manufacturers' accepted method.
- D. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

## **SECTION 096519 - RESILIENT TILE FLOORING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

##### **A. Section Includes:**

1. Rubber floor tile.
2. Solid Vinyl Floor Tile
3. Vinyl composition floor tile.
4. Vinyl enhanced tile.

##### **B. Related Sections:**

1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.
2. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.

#### **1.3 ACTION SUBMITTALS**

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

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.
- B. Maintenance Tutorial: For each type of floor tile, provide a maintenance tutorial for the owners by the manufacturer including the recommended products, procedures, equipment required to retain the flooring at its optimum condition.

#### **1.6 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Floor Tile: Furnish (2) full cartons (90 sq. ft) of each field color and 1 full carton (45 sq. ft), of each accent color in the dye lots installed.

#### **1.7 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

- B. Source Limitations: Obtain each floor tile type through one source from a single manufacturer.

#### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

#### **1.9 FIELD CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F in spaces to receive floor tile during the following time periods:
  1. 48 hours before installation.
  2. During installation.
  3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.

- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- 2.2 ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less. RUBBER FLOOR TILE (RT) Stairwells and Ramps
  - A. Products: Subject to compliance with requirements, provide one of the following:
    - 1. Flexco, Corporation; Flextones Rubber Tile.
    - 2. Johnsonite; A Tarkett Company; Roundel Solid Rubber Tile.
    - 3. Mannington Mills, Inc; Colorscape.
    - 4. Mondo Contract Flooring; Uni
    - 5. Nora Rubber Flooring, Freudenberg Building Systems, Inc; Norament 825.
    - 6. Roppe Corporation, USA; Safe-T-Max.
  - B. Tile Standard: ASTM F 1344, Class I-A, homogeneous rubber tile, **solid** color.
  - C. Hardness: Not less than 85 as required by ASTM F 1344.
  - D. Wearing Surface: Molded pattern.
    - 1. Molded-Pattern Figure: Manufacturers full range of texture patterns.
  - E. Thickness: 0.125 inch.
  - F. Size: 18 by 18 inches, 50 cm by 50 cm, 24 by 24 inches or 1 m by 1 m.
  - G. Colors and Patterns: As selected by Architect from full range of industry colors, minimum (25).

### 2.3 SOLID VINYL FLOOR TILE (SVT)

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Altro; Dolce, Dolce Essentials, and Quartz Tile.
  - 2. Armstrong Flooring, Commercial; Migrations and Striations.
  - 3. Johnsonite, A Tarkett Company; Cortina Grande and Karim Colors Tile.
  - 4. Flexco, Corporation; Delane Solid Vinyl Tile.
- B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
- C. Wearing Surface: Smooth or embossed.
- D. Warranty: 10 year Manufacturer's Warranty.
- E. Complies with ASTM F 1700, Class 1, Type A (Type B for slip resistant tile) Standard Specification for Solid Vinyl Floor Tile.
- F. Colors and Patterns: As selected by Architect from full range of industry colors, minimum (65).
- G. ASTM F 970, Standard Test Method for Static Load Limit – 800 PSI (modified for higher load).
- H. Thickness: 1/8 inch (3.2 mm).
- I. Size: 12 by 12 inches, 16 by 16 inches, and/or 12 by 24 inches.
- J. Colors and Patterns: As selected by Architect from full range of industry colors, minimum (55).

### 2.4 VINYL COMPOSITION FLOOR TILE (VCT)

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Armstrong World Industries, Inc; Standard Excelon Imperial Texture, Classics & Rave.
- B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch.
- E. Size: 12 by 12 inches and/or 12 by 24 inches.
- F. Colors and Patterns: As selected by Architect from full range of industry colors, minimum (65).

### 2.5 VINYL ENHANCED FLOOR TILE (VET)

- A. Products: Subject to compliance with requirements, provide one of the following:



1. Altro; Dolce, Dolce Essentials, and Quartz Tile.
  2. Armstrong Flooring, Commercial; Eco Flooring
  3. Johnsonite, A Tarkett Company; Azterra and Azrock Color Essence Vinyl Enhanced Tile.
  4. Flexco, Corporation; Delane Solid Vinyl Tile.
- B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
  - C. Wearing Surface: Smooth.
  - D. Thickness: 0.125 inch.
  - E. Size: 12 by 12 inches and/or 12 by 24 inches.
  - F. Colors and Patterns: As selected by Architect from full range of industry colors, minimum (65).
  - G. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
  - H. Wearing Surface: Smooth.
  - I. Thickness: 0.125 inch.
  - J. Size: 12 by 12 inches and/or 12 by 24 inches.
  - K. Colors and Patterns: As selected by Architect from full range of industry colors, minimum (65).
- 2.6 INSTALLATION MATERIALS
- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
  - B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
    1. Adhesives shall comply with the following limits for VOC content:
      - a. Vinyl Composition Tile Adhesives: 50 g/L or less.
      - b. Rubber Floor Adhesives: 60 g/L or less.
    2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
  - C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrates pass testing.
  4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations:
    - a. Perform anhydrous calcium chloride test according to ASTM F 1869.
      - 1) Rubber Floor Tile: Proceed with installation only after substrates have

maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

- 2) Vinyl Composition Floor Tile: Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. (2.27 kg of water/92.9 sq. m) in 24 hours.

- b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum **75** percent relative humidity level.

- C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- E. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
  1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor 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 tile at perimeter.
  1. Lay tiles **in pattern indicated**.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  1. Lay tiles **with grain running in one direction and in pattern of colors and sizes indicated**.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  1. Remove adhesive and other blemishes from exposed surfaces.
  2. Sweep and vacuum surfaces thoroughly.
  3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

- D. Floor Polish for Vinyl Composition Tile: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - a. Use commercially available product acceptable to manufacturer and owner.
  - b. Coordinate selection of floor polish with Owner's maintenance service.
  - c. Apply number of coat(s) as recommended in writing by flooring manufacturer for given area.
- E. Initial Maintenance for Rubber Tile: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before performing manufacturer's recommended maintenance.
  - 1. Apply a diluted pH neutral cleaner to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes as recommended in writing by flooring manufacturer.
    - a. Use commercially available product acceptable to manufacturer and owner.
    - b. Remove silicone finish with a diluted pH neutral cleaner/degreaser using flooring and solution manufacturers' accepted method.
- F. Floor Polish for Vinyl Enhanced Tile: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - a. Use commercially available product acceptable to manufacturer and owner.
  - b. Coordinate selection of floor polish with Owner's maintenance service.
  - c. Apply number of coat(s) as recommended in writing by flooring manufacturer for given area.
- G. Cover floor tile until Substantial Completion.

END OF SECTION 096519

**SECTION 096813 - TILE CARPETING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes:
  - 1. Modular, tufted carpet tile.
  - 2. Walk-off carpet tile.
- B. Related Requirements:
  - 1. Section 096513 "Resilient Base and Accessories" and Section 096519 "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
  - 2. Carpet tile type, color, and dye lot.
  - 3. Type of subfloor.
  - 4. Type of installation.
  - 5. Pattern of installation.
  - 6. Pattern type, location, and direction.
  - 7. Pile direction.
  - 8. Type, color, and location of insets and borders.
  - 9. Type, color, and location of edge, transition, and other accessory strips.
  - 10. Transition details to other flooring materials.

- C. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
  - B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
  - C. Sample Warranty: For special warranty.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
    1. Methods for maintaining carpet tile, 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 tile.
- 1.6 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    1. Carpet Tile: Full-size units equal to 2 percent of amount installed for each type indicated, but not less than 10 sq. yd. .
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association.
  - B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Comply with CRI 104.
- 1.9 FIELD CONDITIONS
- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
  - B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
  - C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
  - D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.
- 1.10 WARRANTY
- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
    1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
    2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
    3. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 CARPET TILE, GENERAL

- A. Source Limitations: Obtain each type of carpet tile from single source from single manufacturer.
- B. Performance Characteristics: As follows:
  1. Appearance Retention Rating: Severe Traffic, 3.5 minimum per ASTM D 7330.
  2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
  3. Dry Breaking Strength: Not less than 100 lbf (445 N) per ASTM D 2646.
  4. Tuft Bind: Not less than 8 lbf (28 N) per ASTM D 1335.
  5. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by

physical measurement.

6. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
7. Resistance to Insects: Comply with AATCC 24.
7. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC 165.
8. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) per AATCC 16, Option E.
9. Electrostatic Propensity: Less than 3.5 kV per AATCC 134.
10. Emissions: Provide carpet that complies with testing and product requirements of CRI's "Green Label Plus" program.
11. Emissions: Provide carpet tile that complies with the product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 2.2 CARPET TILE CPTT-A

A. Products: Subject to compliance with requirements, provide one of the following:

1. Interface, Inc.; Aglow
  - a. Color: As selected by Architect from manufacturer's full range.
  - b. Fiber Content: 100 percent Recycled Content Type 6 Nylon.
  - c. Fiber Manufacturer: Aquafil.
  - d. Dye Method: 100 percent Solution Dyed.
  - e. Pile Characteristic: Tufted Patterned Loop.
  - f. Pile Density: 9,257.00 per square yard..
  - g. Pile Thickness: 0.13 inches.
  - h. Backing System: GlasBac® RE Tile.
  - i. Size: 50 cm x 50 cm.
  - j. Applied Soil-Resistance Treatment: Protekt<sup>2</sup>®.
  - k. Lifetime Anti-Microbial: Intersept®.
2. Mohawk Group; Hem
  - a. Color: As selected by Architect from manufacturer's full range.
  - b. Fiber Content: Duracolor® Premium Nylon.
  - c. Dye Method: Solution Dyed/Yarn Dyed.Finished Pile Thickness: .058 inches.
  - d. Tufted Pile Weight: 17.00 oz. per square yard.
  - e. Pile Characteristic: Textured Patterned Loop.
  - f. Gauge: 1/12 inch.
  - g. Surface Pile Density: 8383.
  - h. Backing System: EcoFlex NXT.
  - i. Size: 24 inches by 24 inches.
  - j. Installation Method: Brick Ashlar.
3. Mannington Commercial; Social – Infinity Modular
  - a. Color: As selected by Architect from manufacturer's full range.
  - b. Fiber Content: 100 percent Invista Antron Lumena™ Type nylon 6, 6.
  - c. Dye Method: Solution Dyed.
  - d. Pile Characteristic: Tip-Sheared Patterned Loop.
  - e. Gauge: 5/64 inch.
  - f. Pile Thickness: .121 Inches.
  - g. Backing System: Infinity Modular Reinforced Composite Closed Cell Polymer.
  - h. Size: 24 by 24 inches.
  - i. Applied Soil-Resistance Treatment: Duratech.
  - j. Installation Method: Vertical Ashlar.

## 2.3 WALK-OFF CARPET TILE: CPTT-W

- A. Products: Subject to compliance with requirements, provide one of the following:
1. Interface, Inc.; On Line.
    - a. Color: As selected by Architect from manufacturer's full range.
    - b. Fiber Content: 100 Polypropylene.
    - c. Dye Method: 100 percent Solution Dyed.
    - d. Product Construction: Needle Felt.
    - e. Yarn Weight: 34 ounces.
    - f. Pile Height: .21 inches.
    - g. Backing System: Graphlar.
    - h. Size: 50 cm by 50 cm.
  2. Mohawk Industries, Inc.; First Step & Step In Style
    - a. Color: As selected by Architect from manufacturer's full range of colors.
    - b. Fiber Content: 100 percent nylon 6, 6.
    - c. Fiber Type: 100% Fortis Nylon 6,6 with nylon 6,6 scraper yarn.
    - d. Pile Characteristic: Performance Loop Pile/Textured Patterned Cut and Loop.
    - e. Gauge: 5/32 inch or 1/12 inch.
    - f. Surface Pile Weight: 38 oz./sq. yd./32 oz./sq. yd.
    - g. Pile Thickness: 0.249 inch/0.129 inch.
    - h. Backing System: EcoFlex ICT.
    - i. Size: 24 by 24 inches.
    - j. Applied Soil-Resistance Treatment: Sentry Soil Protection.
  3. Mannington Commercial; Ruffian II, Take Back & Traverse.
    - a. Color As selected by Architect from manufacturer's full range of colors.
    - b. Fiber Content: Type 6,6 Post Production Nylon and Scraper Fiber Type 6,6 Nylon.
    - c. Pile Characteristic: Tip-Sheared Loop/Tufted Loop/Bi-Level Tufted Textured Loop.
    - d. Gauge: 5/32 inch or 1/12 inch.
    - e. Surface Pile Weight: 38 oz./sq. yd./32 oz./sq. yd./ 38 oz./sq. yd.
    - f. Pile Thickness: 0.155, 0.161, 0.142 inches.
    - g. Backing System: Infinity RE Modular Reinforced Composite Closed Cell Polymer.
    - h. Size: 24 by 24 inches.
    - i. Applied Soil-Resistance Treatment: Duratech.
  4. Mats, Inc.; Supreme Nop Tile.
    - a. Color: As selected by Architect from manufacturer's full range of colors.
    - b. Fiber Content: 100% Solution-Dyed UV Stabilized Polypropylene Fibers with 15% post-consumer recycled content.Fiber Type: 100% Fortis Nylon 6,6 with nylon 6,6 scraper yarn.
    - c. Pile Characteristic: Tufted Loop/Bi-Level Tufted Textured Loop.
    - d. Surface Pile Weight: 42 oz./sq. yd.
    - e. Total Weight: 132.4 oz./sq. yd.
    - f. Pile Height: 3/16<sup>th</sup> inch.
    - g. Total Thickness: 7/16<sup>th</sup> inch.
    - h. Backing System: Bitumen .
    - i. Size: 19-11/16" by 19-11/16" inches.
    - j. Colors: As selected by Architect from manufacturer's full range of colors for up to (8) colors.

#### 2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products

and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  3. Use manufacturer's recommended adhesives for installation over a sloped substrate for areas indicated on the Architectural Drawings.
- C. Trowel: Use trowel type recommended in writing by carpet manufacturer for installation of carpet being provided.
- D. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
  2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
  3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
  4. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
    - a. Subfloors must have a pH rating of 5 to 9.
  5. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
- 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 with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical

methods recommended in writing by carpet tile manufacturer.

- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
  - E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.
- 3.3 INSTALLATION
- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
  - B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
    - 1. Follow manufacturer's written recommendations for installation of carpet tile on sloped substrates. Alternate adhesives, trowels and rollers may be required for proper adhesion.
  - C. Installation of carpet base: Follow manufacturer's written recommendations for proper adhesion of carpet base to wall. Do not staple. Install with carpet pile direction running in same direction as carpet tile installation. Provide continuous wrap of material at inside and outside corners. Wrinkles, bubbles and visible adhesive will not be accepted.
  - D. Maintain dye lot integrity. Do not mix dye lots in same area.
  - E. Cut and fit carpet tile 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 tile manufacturer.
  - F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
  - G. 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.
  - H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet tile 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 tile manufacturer.

END OF SECTION 096813

**SECTION 097200 - WALL COVERINGS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Vinyl wall covering.
- B. Related Sections:
  - 1. Division 6 Section "Interior Finish Carpentry" for installation on tack board surfaces.
  - 2. Division 10 Section "Visual Display Surfaces" for installation on tack boards.
  - 3. Division 10 Section "Operable Partitions" for installation on operable partitions.

1.3 ACTION SUBMITTALS



- A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.
- 1.4 INFORMATIONAL SUBMITTALS
  - A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.
- 1.5 CLOSEOUT SUBMITTALS
  - A. Maintenance Data: For wall coverings to include in maintenance manuals.
- 1.6 QUALITY ASSURANCE
  - A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - 1. Surface-Burning Characteristics: As follows, per ASTM E 84:
      - a. Flame-Spread Index: 25 or less.
      - b. Smoke-Developed Index: 450 or less.
    - 2. Fire-Growth Contribution: Textile wall coverings complying with acceptance criteria of UBC Standard 8-2.
    - 3. Fire-Growth Contribution: Textile wall coverings tested according to NFPA 286 and complying with test protocol and criteria in the 2003 IBC.
- 1.7 PROJECT CONDITIONS
  - A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
  - B. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.
  - C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

## PART 2 - PRODUCTS

- 2.1 WALL COVERINGS
  - A. General: Provide rolls of each type of wall covering from same print run or dye lot.
- 2.2 VINYL WALL COVERING (WC-A: Tack Boards)
  - A. Vinyl Wall-Covering Standards: Provide mildew-resistant products complying with the following:
    - 1. FS CCC-W-408D and JCFFA-W-101-D for Type II, Medium-Duty products.
    - 2. Products: Subject to compliance with requirements, provide one of the following:
      - a. Desert Sand; Koroseal, a division of RJF International Corporation.
      - b. Aries; Versa, a division of LSI Wallcovering.
      - c. Stardust LX; Genon, a division of Omnova Solutions, Inc.
  - B. Total Weight Excluding Coatings: 20 oz. per lineal yard, minimum.
  - C. Width: 54 inches.
  - D. Backing: Osnaburg fabric.
  - E. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range of (100) colors, minimum.
- 2.3 ACCESSORIES
  - A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application; as recommended in writing by wall-covering manufacturer.
    - 1. Adhesive shall have VOC content of [50] g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## PART 3 - EXECUTION

- 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
  - B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Comply with manufacturer's written instructions for surface preparation.
  - B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
  - C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
    - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
    - 2. Metals: If not factory primed, clean and apply metal as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
    - 3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
    - 4. Painted Surfaces: Treat areas susceptible to pigment bleeding.
  - D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
  - E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.
- 3.3 INSTALLATION
- A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated except where more stringent requirements apply.
  - B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.
  - C. Install strips in same order as cut from roll.
  - D. Install reversing every other strip.
  - E. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
  - F. Match pattern 72 inches above the finish floor.
  - G. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.
  - H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
  - I. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.
- 3.4 CLEANING
- A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
  - B. Use cleaning methods recommended in writing by wall-covering manufacturer.
  - C. Replace strips that cannot be cleaned.
  - D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

**SECTION 099123 - INTERIOR PAINTING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete.
  - 2. Concrete masonry units (CMU).
  - 3. Steel.
  - 4. Galvanized metal.
  - 5. Gypsum board.
- B. Related Requirements:
  - 1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.
  - 2. Section 099600 "High-Performance Coatings" for high-performance and special-use coatings.
  - 3. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
  - 4. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

### 1.3 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Product List: For each product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  - 2. VOC content.

### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 5 gal. (18.9 L) for field colors and 1 gal. (3.8 L) of each accent color applied.

### 1.6 QUALITY ASSURANCE

- A. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- C. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- D. Paint mockups as required per owners and architect.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to 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 well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .
    - 1. Maintain containers in clean condition, free of foreign materials and residue.
    - 2. Remove rags and waste from storage areas daily.
- 1.8 FIELD CONDITIONS
- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F .
  - B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following]:
  - 1. Benjamin Moore & Co.
  - 2. PPG Architectural Finishes, Inc.
  - 3. Sherwin-Williams Company (The).

### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- A. VOC Content of Field-Applied Interior Paints and Coatings: Products shall comply with VOC limits of authorities having jurisdiction.
  - 3. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
  - 4. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
  - 5. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  - 6. Floor Coatings: VOC not more than 100 g/L.
- B. Colors: Match Architect's samples.

### 2.3 BLOCK FILLERS

- A. Interior/Exterior Latex Block Filler: MPI#4
  - 1. Benjamin Moore: Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
  - 2. PPG Architectural Finishes, Inc.: 6-7 Speedhide Latex Block Filler.
  - 3. Sherwin-Williams Company (The): B25W00025 PrepRite Block Filler.

### 2.4 PRIMERS/SEALERS

- A. Primer Sealer, Interior, Institutional Low Odor/VOC: MPI#149
  - 1. Benjamin Moore: Ultra Spec 500 Interior Latex Primer N534 (0 g/L), MPI # 50, X-Green 50,

- 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.
  - 2. PPG Architectural Finishes, Inc.: 6-4900 Speedhide Zero VOC Latex Primer Sealer.
  - 3. Sherwin-Williams Company (The): B28W2600 ProMar 200 Zero VOC Primer
- 2.5 METAL PRIMERS
- A. Primer, Acrylic, Anti-Corrosive, for Metal: MPI#107
    - 1. Benjamin Moore: Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
    - 2. PPG Architectural Finishes, Inc.: 90-912 Pitt Tech Plus Primer.
    - 3. Sherwin-Williams Company (The): B66W00310 Pro Industrial Pro-Cryl Universal Primer.
- 2.6 WATER-BASED PAINTS
- A. Latex, Interior, Institutional Low Odor/VOC, Flat (Gloss Level 1):MPI#143
    - 1. Benjamin Moore: Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
    - 2. PPG Architectural Finishes, Inc.: 6-4110 Speedhide zero VOC Interior Flat.
    - 3. Sherwin-Williams Company (The):.ProMar 200 Zero VOC Interior Latex Flat B30W12651
  - B. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 3):MPI#145
    - 1. Benjamin Moore: Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009, LEED V4, CHPS Certified.
    - 2. PPG Architectural Finishes, Inc.: 6-4310 Speedhide zero VOC Interior Eggshell.
    - 3. Sherwin-Williams Company (The): ProMar 200 Zero VOC Eg-Shel in Lieu of MPI#145.
  - C. Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (Gloss Level 5):MPI#141
    - 1. Benjamin Moore: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, X-Green 147, 141, X-Green 141, LEED 2009, LEED V4.
    - 2. PPG Architectural Finishes, Inc.: 6-4510 Speedhide zero VOC Interior Semi-Gloss.
    - 3. Sherwin-Williams Company (The): ProMar 200 Zero VOC Interior Latex Semi-Gloss in Lieu of MPI #141
- 2.7 SOLVENT-BASED PAINTS
- A. Alkyd, Interior, Semi-Gloss (Gloss Level 5): MPI#47
    - 1. Benjamin Moore: Super Spec Alkyd Semi Gloss Enamel C271, MPI 147.
    - 2. PPG Architectural Finishes, Inc.: 6-1510 Speedhide Alkyd WB Water Base Alkyd Semi-Gloss.
    - 3. Sherwin Williams Company (The): Protective & Marine, Steel Spec Universal Metal Primer.
- 2.8 HANDRAILS
- A. Waterborne Catalyzed Epoxy, Interior, Gloss (Gloss Level 6): MPI#115
    - 1. Benjamin Moore: Corotech Acrylic Epoxy V450 (168 g/L) MPI 115
    - 2. PPG Architectural Finishes, Inc.: PittGlaze 16-551 Acrylic Epoxy Gloss
    - 3. Sherwin-Williams Company (The): B73-300 Series, Pro Industrial Zero VOC Waterborne Catalyzed Epoxy.
- 2.9 DRY FOG/FALL COATINGS
- A. Dry Fall, Water Based, Flat (Gloss Level 1): MPI#118
    - 1. Benjamin Moore: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118
    - 2. PPG Architectural Finishes, Inc.: 6-715xi Speedhide Flat Dry Fall.
    - 3. Sherwin-Williams Company (The): B42W000181 Pro Industrial Low VOC Waterborne Acrylic Dryfall Flat.
- 2.10 FLOOR COATINGS
- A. Sealer, Solvent Based, for Concrete Floors: MPI#104
    - 1. Benjamin Moore: Tuffcrete Solvent Acrylic Concrete Stain & Waterproofing Sealer Clear CST- 5100, MPI 104.
    - 2. PPG Architectural Finishes, Inc.: 99-127 MegaSeal HSPC Clear Primer/Sealer.
    - 3. Sherwin-Williams Company (The): H&C Colortop Solvent-Based Clear 250.

- B. Hardener & Densifier, Solvent Based, for Polished Concrete Floors:
  1. Benjamin Moore: N/A.
  2. PPG Architectural Finishes, Inc.: N/A
  3. General Polymers, Sherwin-Williams Company (The): 55030035-20/650297278 H&C Clear Liquid Hardener & Densifier.
- 2.11 SOURCE QUALITY CONTROL
  - A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
    1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
    2. Testing agency will perform tests for compliance with product requirements.
    3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
    1. Concrete: 12 percent.
    2. Masonry (Clay and CMU): 12 percent.
    3. Gypsum Board: 12 percent.
  - C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
  - D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
  - E. Proceed with coating application only after unsatisfactory conditions have been corrected.
    1. Application of coating indicates acceptance of surfaces and conditions.
- 3.2 PREPARATION
  - A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
  - B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
    1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
  - C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
    1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
  - D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
  - E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in equipment rooms:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - 2. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.

- f. Plastic conduit.
  - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - h. Other items as directed by Architect.
3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

#### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
- 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

#### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

#### 3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces:
- 1. Solvent-Based Clear Sealer System:
    - a. First Coat: Sealer, solvent based, for concrete floors.
    - b. Topcoat: Sealer, solvent based, for concrete floors.
    - c. Surfaces: Sealed concrete floors in mechanical, electrical and technology rooms.
  - 2. Solvent Based Hardener & Densifier for Polished Concrete Floors:
    - a. First Coat: Hardener & densifier, solvent based, for polished concrete floors.
    - b. Topcoat: Hardener & densifier, solvent based, for polished concrete floors.
    - c. Surfaces: Polished concrete floors in welding rooms.
- B. CMU Substrates:
- 1. Institutional Low-Odor/VOC Latex System:
    - a. Block Filler: Block filler, latex, interior/exterior.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5).
    - d. Surfaces: New masonry walls, graphics (do not use in high humidity areas).
- C. Steel Substrates:
- 1. Water-Based Dry-Fall System:
    - a. Prime Coat: Primer, acrylic, anti-corrosive, for metal or primer, acrylic, quick dry, for metal.
    - b. Topcoat: Dry fall, water based, flat (Gloss Level 1).
    - c. Surfaces: Exposed metal decking, trusses, structural steel, metal joists.
  - 2. Alkyd System: Prime Coat: Primer, acrylic, anti-corrosive, for metal.
    - a. Intermediate Coat: Alkyd, interior, matching topcoat.
    - b. Topcoat: Alkyd, interior, semi-gloss (Gloss Level 5).



- c. Surfaces: Hollow metal doors, frames, door mullions, railings, ferrous metal surfaces.
- D. Galvanized-Metal Substrates:
  - 1. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer, galvanized, water based.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5).
    - d. Surfaces: Exposed metal decking, galvanized metal surfaces.
- E. Gypsum Board Substrates:
  - 1. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, flat (Gloss Level 1).
    - d. Surfaces: Drywall ceilings and soffits subject to no abuse.
  - 2. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, egg-shell (Gloss Level 3).
    - d. Surfaces: Drywall walls in administration areas.
  - 3. Institutional Low-Odor/VOC Latex System:
    - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.
    - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5).
    - d. Surfaces: Drywall walls in classrooms and student-occupied areas.

END OF SECTION 099123

## **SECTION 099300 - STAINING AND TRANSPARENT FINISHING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes surface preparation and application of wood finishes on the following substrates:

- 1. Interior Substrates:
  - a. Dressed lumber (finish carpentry).

- B. Related Requirements:

- 1. Section 099113 "Exterior Painting" for standard paint systems on exterior substrates.
- 2. Section 099123 "Interior Painting" for stains and transparent finishes on concrete floors.
- 3. Section 099600 "High-Performance Coatings" for transparent high-performance coatings on concrete floors and clay masonry.

#### **1.3 DEFINITIONS**

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- D. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- E. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

- B. Product List: For each product indicated, include the following:
  1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  2. VOC content.
- 1.5 QUALITY ASSURANCE
  - A. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
  - B. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
  - C. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- 1.6 DELIVERY, STORAGE, AND HANDLING
  - A. Deliver materials to 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 well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .
    1. Maintain containers in clean condition, free of foreign materials and residue.
    2. Remove rags and waste from storage areas daily.
- 1.7 FIELD CONDITIONS
  - A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F .
  - B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
  - C. Do not apply exterior finishes in snow, rain, fog, or mist.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Glidden Professional.
  2. PPG Architectural Finishes, Inc.
  3. Sherwin-Williams Company (The).

### 2.2 MATERIALS, GENERAL

- A. Material Compatibility:
  1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
- B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.
  1. Clear Wood Finishes, Varnishes: VOC not more than 275 g/L.
  2. Stains: VOC not more than 100 g/L.

3. Primers, Sealers, and Undercoaters: 100 g/L.

C. Stain Colors: Match Architect's samples.

### 2.3 STAINS

A. Stain, Semi-Transparent, for Interior Wood:

1. Glidden Professional: 1700V Woodpride Water-Based Semi Transparent Stain.
2. PPG Architectural Finishes, Inc.: 44500 Olympic Low VOC Wood Stain.
3. Sherwin-Williams Company (The): A49T00804 Wood Classics 250 VOC Interior Oil Stain Clear Base.

### 2.4 WATER-BASED VARNISHES

A. Varnish, Water Based, Clear, Satin (Gloss Level 4):

1. Glidden Professional: 1802 Woodpride Water-Based Satin Varnish.
2. PPG Architectural Finishes, Inc.: 42786 Olympic WB Urethane Satin Varnish.
3. Sherwin-Williams Company (The): A68F00090 Wood Classics Waterborne Polyurethane Varnish Satin Clear.

### 2.5 SOURCE QUALITY CONTROL

A. Testing of Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with finish application only after unsatisfactory conditions have been corrected.
  1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
  1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
  1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly.

- Remove loose wood fibers by brushing.
- 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
- 3. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.
- D. Interior Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
  - 3. Sand surfaces that will be exposed to view and dust off.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for finish and substrate indicated.
  - 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
  - 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

### 3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

### 3.5 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

- A. Wood substrates, nontraffic surfaces, including wood trim and architectural woodwork.
  - 1. Water-Based Varnish over Stain System, MPI INT 6.3W:
    - a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90
    - b. First Intermediate Coat: Water-based varnish matching topcoat.
    - c. Second Intermediate Coat: Water-based varnish matching topcoat.
    - d. Topcoat: Varnish, water based, clear, satin (Gloss Level 4).

END OF SECTION 099300

## **SECTION 101100 - VISUAL DISPLAY SURFACES**

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Markerboards.
  - 2. Tackboards.
  - 3. Visual display wall coverings.

- B. Related Sections:
  - 1. Section 097200 "Wall Coverings" for tackable, vinyl wall coverings installed on tackboards.
- 1.3 DEFINITIONS
  - A. Tackboard: Framed or unframed, tackable, visual display board assembly.
  - B. Visual Display Board Assembly: Visual display surface that is factory fabricated into composite panel form, either with or without a perimeter frame; includes chalkboards, markerboards, and tackboards.
  - C. Visual Display Surface: Surfaces that are used to convey information visually, including surfaces of markerboards, tackboards, and surfacing materials that are not fabricated into composite panel form but are applied directly to walls.
- 1.4 ACTION SUBMITTALS
  - A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for visual display surfaces.
    - 1. Include individual panel weights for sliding visual display units.
  - B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.
    - 1. Show locations of panel joints.
    - 2. Include sections of typical trim members.
- 1.5 INFORMATIONAL SUBMITTALS
  - A. Qualification Data: For qualified Installer.
  - B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of fabrics.
  - C. Maintenance Data: For visual display surfaces to include in maintenance manuals.
  - D. Warranties: Sample of special warranties.
- 1.6 QUALITY ASSURANCE
  - A. Source Limitations: Obtain visual display surfaces from single source from single manufacturer.
  - B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - 1. Flame-Spread Index: 25 or less.
    - 2. Smoke-Developed Index: 450 or less.
- 1.7 DELIVERY, STORAGE, AND HANDLING
  - A. Deliver factory-built visual display surfaces, including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two 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.
  - B. Store visual display surfaces vertically with packing materials between each unit.
- 1.8 PROJECT CONDITIONS
  - A. Environmental Limitations: Do not deliver or install visual display surfaces until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
  - B. Field Measurements: Verify actual dimensions of construction contiguous with visual display surfaces by field measurements before fabrication.
- 1.9 WARRANTY
  - A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or

workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
  - a. Surfaces lose original writing and erasing qualities.
  - b. Surfaces exhibit crazing, cracking, or flaking.
2. Warranty Period: 50 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: Porcelain-enamel-clad, ASTM A 463/A 463M, Type 1, stretcher-leveled aluminized steel, with 24-gauge uncoated thickness; with porcelain-enamel coating fused to steel at approximately 1000 deg F. Porcelain enamel chalk and marker surfaces shall be manufactured in accordance with Porcelain Enamel Institute's specifications. Porcelain enamel shall be machine sprayed or rolled to enameling grade steel with a ground coat both sides and colored cover coat on the face. Ground coat shall be a minimum 15-microns and facing cover coat to be a minimum 60-microns.
  1. Gloss Finish: Low gloss; dry-erase markers wipe clean with dry cloth or standard eraser. Suitable for use as projection screen.
- B. Vinyl Fabric: Mildew resistant, washable, complying with FS CCC-W-408D, Type II, stipple-textured finish (Desert Sand); weighing not less than 20 oz./sq. yd.; with flame-spread index of 25 or less when tested according to ASTM E 84. Architect will select from manufacturer's full range of colors (minimum 100) of material specified in section 097200 "Wall Coverings" for this project.
- C. Hardboard: ANSI A135.4, tempered.
- D. Particleboard: ANSI A208.1, Grade M-1, made with binder containing no urea formaldehyde, that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small- Scale Environmental Chambers."
- E. Extruded Aluminum: ASTM B 221 , Alloy 6063.
- F. Adhesives: Manufacturer's standard product.

### 2.2 MARKERBOARD ASSEMBLIES

- A. Porcelain-Enamel Markerboards: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction consisting of backing sheet, core material, and 24-gauge porcelain-enamel face sheet with with gloss finish suitable for projection.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Best-Rite Manufacturing.
    - b. Claridge Products and Equipment, Inc.
    - c. Educational Equipment Corp.
    - d. Marsh Industries, Inc.; Visual Products Group.
    - e. Platinum Visual Systems; a division of ABC School Equipment, Inc.
    - f. PolyVision Corporation; a Steelcase company.
  2. Particleboard Core: 3/8 inch thick; with 0.005-inch- thick, aluminum foil backing.
  3. Laminating Adhesive: Manufacturer's standard, moisture-resistant thermoplastic type.

### 2.3 TACKBOARD ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Best-Rite Manufacturing.
  2. Claridge Products and Equipment, Inc.
  3. Educational Equipment Corp.
  4. Marsh Industries, Inc.; Visual Products Group.
  5. Platinum Visual Systems; a division of ABC School Equipment, Inc.

6. PolyVision Corporation; a Steelcase company.
  - B. Vinyl-Fabric-Faced Tackboard: 1/4-inch- thick, vinyl-fabric-faced cork sheet factory laminated to 1/4- inch- thick hardboard backing.
  - C. Vinyl Fabric: As selected by architect from manufacturer's full range of colors per Specification Section 097200 for this project.
- 2.4 MARKERBOARD AND TACKBOARD ACCESSORIES
- A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; of size and shape indicated on Drawings.
    1. Factory-Applied Trim: Manufacturer's standard, continuous to full width of visual display unit from outside edge to outside edge.
  - B. Chalktray: Manufacturer's standard, continuous to full width of visual display unit from outside edge to outside edge.
    1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
  - C. Map Rail: Provide the following accessories:
    1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 2 inches wide.
    2. End Stops: Located at each end of map rail.
    3. Map Hooks and Clips: Two map hooks with flexible metal clips for every 48 inches of map rail or fraction thereof.
    4. Flag Holder: One for each room.
- 2.5 FABRICATION
- A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.
  - B. Visual Display Boards: Factory assembled visual display boards unless otherwise indicated.
    1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.
  - C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.
    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 vertical-joint spline system between abutting sections of markerboards.
    3. Provide manufacturer's standard mullion trim at joints between markerboards and tackboards of combination units.
    4. 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.
  - D. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.
    1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.
- 2.6 VISUAL DISPLAY WALL COVERINGS
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    1. Best-Rite Manufacturing.
    2. Egan Visual Inc.
    3. Marsh Industries, Inc.; Visual Products Group.

4. Omnova Solutions Inc.; Decorative Products; Commercial Wallcovering.
  5. walltalkers; a division of RJF International Corporation.
- B. Magnetic Visual Display Wall Covering: Intended for use with dry-erase markers and magnetic aids and consisting of moderate-gloss plastic film bonded to ferrous-powdered fabric backing; not less than 0.0006-mm total thickness.
1. Color: As selected by Architect from manufacturer's full range.
- C. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application, as recommended in writing by wall covering manufacturer.
1. Adhesive shall have a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Primer/Sealer: Mildew-resistant primer/sealer complying with requirements in **Section 099113 "Interior Painting; 2.4 Primers/Sealers"** and recommended in writing by wall covering manufacturer for intended substrate.

## 2.7 GENERAL FINISH REQUIREMENTS

- 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: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.8 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

## 2.9 VISUAL DISPLAY SURFACE SCHEDULE

- A. Visual Display Board: Factory assembled.
  1. Markerboard: Porcelain-enamel markerboard assembly.
    - a. Color: White.
  2. Corners: Square.
  3. Width: As indicated on Drawings.
  4. Height: As indicated on Drawings.
  5. Mounting: Wall.
  6. Mounting Height: As indicated on Drawings.
  7. Factory-Applied Aluminum Trim: Manufacturer's standard with clear anodic finish.
  8. Accessories:
    - a. Chalktray: Box type.
    - b. Map rail with display rail, end stops, map hooks and clips and flag holder.
- B. Tackboard: Factory assembled.
  1. Tack Surface: Vinyl-fabric-faced tackboard assembly.
  2. Corners: Square.
  3. Width: As indicated on Drawings.
  4. Height: As indicated on Drawings.
  5. Mounting: Wall.
  6. Mounting Height: As indicated on Drawings.
  7. Edges: Concealed by trim.
    - a. Factory-Applied Aluminum Trim: Manufacturer's standard style, with clear anodic finish.

## PART 3 - EXECUTION



- 3.1 EXAMINATION
- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
  - B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motor-operated, sliding visual display units.
  - C. Examine walls and partitions for proper preparation and backing for visual display surfaces.
  - D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.
  - E. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Comply with manufacturer's written instructions for surface preparation.
  - B. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display boards, including dirt, mold, and mildew.
  - C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display surfaces and wall surfaces.
- 3.3 INSTALLATION, GENERAL
- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
    - 1. Mounting Height for Grades Pre-K through K]: 24 inches above finished floor to top of chalktray.
    - 2. Mounting Height [for Grades 1 through 4]: 30 inches above finished floor to top of chalktray.
    - 3. Mounting Height [for Grades 5 and Higher]: 36 inches above finished floor to top of chalktray.
- 3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES
- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches o.c. Secure both top and bottom of boards to walls.
- 3.5 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY UNITS
- A. Sliding Visual Display Units: Install units in recessed locations and at mounting heights indicated. Attach to wall framing with fasteners at not more than 16 inches o.c.
    - 1. Adjust panels to operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- 3.6 INSTALLATION OF VISUAL DISPLAY WALL COVERING
- A. Install visual display wall covering according to requirements specified in Section 097200 "Wall Coverings."
  - B. General: Comply with visual display wall covering manufacturers' written installation instructions.
  - C. Install seams horizontal and level, with lowest seam 24 inches above finished floor. Railroad fabric (reverse roll direction) to ensure color matching.
  - D. Double cut seams, with no gaps or overlaps. Remove air bubbles, wrinkles, blisters, and other defects.
  - E. After installation, clean visual display wall covering according to manufacturer's written instructions. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- 3.7 CLEANING AND PROTECTION
- A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.
  - B. Touch up factory-applied finishes to restore damaged or soiled areas.

- C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 101100

## **SECTION 101423 - PANEL SIGNAGE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

##### **A. Section Includes:**

1. Panel signs.
2. Field-applied, vinyl-character signs.

##### **B. Related Requirements:**

1. Section 015000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
2. Section 088000 "Glazing" for tempered glazing in display cases.
3. Section 101416 "Plaques" for building dedication plaques.
4. Section 101419 "Dimensional Letter Signage" for cast dimensional letters.
5. Section 101426 "Monument Signage" for internally illuminated hollow box-type monument signs.
6. Section 142400 "Hydraulic Elevators" and Section 144200 "Wheelchair Lifts" for code-required conveying equipment signage.
7. Section 220553 "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
8. Section 230553 "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.
9. Section 260553 "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.

#### **1.3 ACTION SUBMITTALS**

##### **A. Product Data:** For each type of product.

##### **B. Shop Drawings:** For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
  - a. Final room names and numbers will be coordinate between Architect and Owner prior to fabrication. Fabricator must use final Owner-approved list supplied by Architect for sign fabrication.

##### **C. Samples for Verification:** For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Panel Signs: Full-size Sample.
2. Field-Applied, Vinyl-Character Signs: Full-size Sample of characters.

##### **D. Sign Schedule:** Use same designations specified or indicated on Drawings or in a sign schedule.

#### **1.4 INFORMATIONAL SUBMITTALS**

##### **A. Qualification Data:** For Installer and manufacturer.

#### **1.5 CLOSEOUT SUBMITTALS**

##### **A. Maintenance Data:** For signs to include in maintenance manuals.

#### **1.6 QUALITY ASSURANCE**

##### **A. Installer Qualifications:** Manufacturer of products or an entity that employs installers and

supervisors who are trained and approved by manufacturer.

#### 1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

#### PART 2 - PRODUCTS

##### 2.1 PANEL SIGNS, GENERAL

- A. Regional Materials: Panel signs shall be manufactured within 500 miles of Project site.

##### 2.2 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.

- 1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces.

##### 2.3 SIGNS

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

- 1. ASI Sign Systems, Inc.
- 2. Bayuk Graphic Systems, Inc.
- 3. Best Sign Systems Inc.
- 4. Columbus Graphics, Inc.
- 5. Mohawk Sign Systems.
- 6. R.E.M. Graphics.
- 7. Roban, Inc.
- 8. Signets, Inc.

- B. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

- 1. Solid-Sheet sign and Returns: Aluminum sheet with finish specified in "Surface Finish and Applied Graphics" Subparagraph below and as follows:
  - a. Thickness: Match thickness of adjacent laminated-sheet sign.
  - b. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
- 2. Fully-Tempered Float Glass Signs: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
  - a. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
  - b. Decorative Film Overlay: Translucent, dimensionally stable, cast PVC film, 2-mil- (0.05-mm-) minimum thickness, with pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.
  - c. Colors and Patterns: Match to Architect's selections for millwork display cases per 088000 "Glazing".
  - d. Surface-Applied Graphics: Applied vinyl film.
- 3. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
  - a. Composite-Sheet Thickness: 0.125 inch.
  - b. Surface-Applied Graphics: Applied vinyl film.
  - c. Subsurface Graphics: Reverse halftone or dot-screen image and slide-in changeable insert as scheduled.
- 4. Sign-Panel Perimeter: Finish edges smooth.
  - a. Edge Condition: Square cut.
  - b. Corner Condition in Elevation: Square.

5. Mounting: Surface mounted to wall with silicone adhesive.
6. Surface Finish and Applied Graphics:
  - a. Custom integral Acrylic Sheet Color: Match Sherwin-Williams' paint color matching system.
7. Text and Typeface: Accessible raised characters and Braille in typeface matching Architect's sample. Finish raised characters to contrast with background color, and finish Braille to match background color.
8. Flatness Tolerance: Sign panel shall remain flat or uniformly curved under installed conditions as indicated and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

#### 2.4 FIELD-APPLIED, VINYL-CHARACTER SIGNS

- A. Field-Applied, Vinyl-Character Sign: Prespaced characters die cut from 3- to 3.5-mil thick, weather-resistant vinyl film with release liner on the back and carrier film on the front for on-site alignment and application.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ASI Sign Systems, Inc.
    - b. Bayuk Graphic Systems, Inc.
    - c. Best Sign Systems Inc.
    - d. Columbus Graphics, Inc.
    - e. Mohawk Sign Systems.
    - f. R.E.M. Graphics.
    - g. Roban, Inc.
    - h. Signets, Inc.
  2. Size: As indicated on drawings.
  3. Substrates: Walls, Metal, FRP (fiber reinforced plastic).
  4. Text and Font: As indicated on drawings.

#### 2.5 PANEL-SIGN MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- C. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.
- D. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

#### 2.6 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  1. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
- B. Exposed Metal-Fastener Components, General:
  1. Fabricated from anodized aluminum or stainless steel unless otherwise indicated.
  2. Wall-mounted Signs: Decorative projecting flat standoff cap, assembly and base for glass-to-metal panel signs in dimensions as indicated on Architectural Drawings for substrate indicated. Install with tamper-resistant screws.
  3. Ceiling-mounted Signs: Decorative suspended cable ceiling mounting assembly, including cable, ceiling connectors, sign holders and concealed support brackets, for panel signs in

dimensions as indicated on Architectural Drawings for substrate indicated.

C. Adhesives: As recommended by sign manufacturer.

## 2.7 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Provide rabbets, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

C. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

D. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

E. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert with text as scheduled. Furnish two blank inserts for each sign for Owner's use.
2. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. Furnish initial sign panel. .

## 2.8 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## 2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

B. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchor inserts are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Mounting Methods:
  - 1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
- C. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages, and apply and firmly press characters into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.
- D. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

## SECTION 102600 - WALL AND DOOR PROTECTION

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Corner guards.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.
- B. Shop Drawings: For each impact-resistant wall protection unit showing locations and

extent. Include sections, details, and attachments to other work.

- C. Samples for Initial Selection: For each type of impact-resistant wall protection unit indicated.
  - D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
    - 1. Corner Guards: 12 inches long. Include examples of joinery, corners, end caps, top caps, and field splices.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Material Certificates: For each impact-resistant plastic material, from manufacturer.
  - B. Warranty: Sample of special warranty.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.
- 1.6 MAINTENANCE MATERIAL SUBMITTALS**
- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    - 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 5 percent of each type, color, and texture of units installed, but no fewer than (1) 96-inch long units.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
  - B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.
  - C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 014000 "Quality Requirements."
    - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
  - D. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
    - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
    - 2. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
      - a. Store corner-guard covers in a vertical position.
      - b. Store covers in a horizontal position.
- 1.9 PROJECT CONDITIONS
- A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

**1.10 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Deterioration of plastic and other materials beyond normal use.
  - 2. Warranty Period: Five years from date of Substantial Completion. PART

## 2 - PRODUCTS

### 2.1 MATERIALS

- A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; extruded material, thickness as indicated.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
- C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
- D. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of [70] <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### 2.2 CORNER GUARDS

- A. Surface-Mounted, Resilient, Plastic Corner Guards (CG): Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Construction Specialties, Inc.
    - b. JL Industries, Inc.
    - c. Nystrom, Inc.
    - d. Korogard Wall Protection Systems; a division of RJF International Corporation.**
  - 2. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; as follows:
    - a. Profile: Nominal 2-inch- long leg and 1/4-inch corner radius.
    - b. Height: 8 feet.
    - c. Color and Texture: As selected by Architect from manufacturer's full range.
  - 3. Retainer: Minimum 0.060-inch- thick, one-piece, extruded aluminum.
  - 4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
  - 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

### 2.3 FABRICATION

- A. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- B. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

## PART 3 - EXECUTION



- 3.1 EXAMINATION
- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  - B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
    - 1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - C. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.2 PREPARATION
- A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.
  - B. Before installation, clean substrate to remove dust, debris, and loose particles.
- 3.3 INSTALLATION
- A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
    - 1. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
      - a. Provide anchoring devices to withstand imposed loads.
      - b. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches.
      - c. Adjust end and top caps as required to ensure tight seams.
- 3.4 CLEANING
- A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.
  - B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 104416 - FIRE EXTINGUISHERS

**PART 1 - GENERAL**

- 1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- 1.3 ACTION SUBMITTALS
- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Warranty: Sample of special warranty.
- 1.5 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

## 1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10.
    - b. Faulty operation of valves or release levers.**
  - 2. Warranty Period: Six years from date of Substantial Completion. PART

## 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

### 2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each and mounting bracket indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. JL Industries, Inc.; a division of the Activar Construction Products Group.
    - b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - c. Larsens Manufacturing Company.
    - d. Potter Roemer LLC.
  - 2. Valves: Manufacturer's standard.
  - 3. Handles and Levers: Manufacturer's standard.
  - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Multipurpose Dry-Chemical Type in Steel Container Insert drawing designation: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
- C. Type-K Dry-Chemical Type in Brass Container (for commercial kitchen): UL-rated 80-B:C, 10-lb nominal capacity, with potassium bicarbonate-based dry chemical in chrome-plated-brass container.
- D. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
- E. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Vertical.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in

compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 123216 - MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad casework.
2. Plastic-laminate faced wood music cabinets of stock design.:
3. Custom millwork.:
4. Hardware and accessories.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood blocking for anchoring casework.
2. Section 062000 "Interior Finish Carpentry.":
3. Section 092216 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
4. Section 096513 "Resilient Base and Accessories" for resilient base applied to plastic-laminate-clad casework.
5. Section 123623.13 "Plastic-Laminate-Clad Countertops."
6. Division 22 "Plumbing":
  - a. Furnishing and installation of service fixtures.:
  - b. Furnishing and installation of waste lines and traps.:
7. Division 23 Mechanical and Division 26 Electrical.:
  - a. Furnishing and installation of service fixtures.:

1.2 DEFINITIONS

- A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.

B. MDF:

1. Medium Density Fiberboard.

C. Hardboard Plywood:

1. A panel product composed of layer or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.

- D. Exposed Portions of Cabinets: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches (1220 mm) above floor, and surfaces visible in open **cabinets.**

- E. Semiexposed Portions of Cabinets: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches (1980 mm) or more above floor are defined as semiexposed.

- F. Concealed Portions of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1. Construction Manager, Contractor, and Architect to be in attendance.

1.4 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related

units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

#### 1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
3. Environmental Product Declaration (EPD): For each product.
4. Environmental Product Declaration: For each product.
5. Third-Party Certifications: For each product.
6. Chain-of-Custody Qualification Data: For manufacturer and vendor.
7. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
8. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
9. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
10. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
11. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.
12. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
13. Product Data: For composite wood products, indicating compliance with requirements for formaldehyde emissions.

C. Shop Drawings: For plastic-laminate-clad casework.

1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
2. Indicate types and sizes of casework.
3. Indicate manufacturer's catalog numbers for casework.
4. Show fabrication details, including types and locations of hardware.
5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.
6. Apply AWI's Quality Certification Program label to Shop Drawings.

D. Samples: For casework and hardware finishes.

E. Samples for Initial Selection: For casework and hardware finishes.

F. Samples for Verification: For the following:

1. Plastic Laminates: 3 by 5 inches, for each type, color, pattern, and surface finish required.
2. Thermally Fused Laminate Panels: 3 by 5 inches, for each color, pattern, and surface finish.
  - a. Provide edge banding on one edge.

#### 1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For casework manufacturer, and, Installer.

B. Sample Warranty: For special warranty.

#### 1.7 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI's Quality Certification Program certificates.

#### 1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an

FSC-accredited certification body.

- B. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.
  - C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
  - D. Installer Qualifications: and, Licensed participate in AWI's Quality Certification Program.
- 1.9 DELIVERY, STORAGE, AND HANDLING
- A. Deliver manufactured wood casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.
  - B. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.
- 1.10 FIELD CONDITIONS
- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during remainder of construction period. Maintain temperature and relative humidity during remainder of construction period in range recommended for Project location by the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
  - C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.
  - D. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.
- 1.11 WARRANTY
- A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.
    - 1. Failures include, but are not limited to, the following:
      - a. Delamination of components or other failures of glue bond.
      - b. Warping of components.
      - c. Failure of operating hardware.
      - d. Deterioration of finishes.
    - 2. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL REQUIREMENTS FOR CASEWORK**

- A. Manufacturers:
  - 1. Custom Fabricators, Inc.
  - 2. Dover Cabinet Industries
  - 3. Eurocase
  - 4. Riceland Cabinet, Inc.
  - 5. Royal Cabinet Design Company
- B. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.
  - 1. Grade: Custom.

2. Provide labels and certificates from AWI certification program indicating that casework complies with requirements of grades specified.
- C. Product Designations:
1. Drawings indicate sizes, configurations, and finish materials of manufactured plastic-laminate-clad casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."
  2. Drawings indicate configurations of manufactured plastic-laminate-clad casework by referencing designations of Casework Design Series numbering system in the Appendix of the AWI/AWMAC/WI's "Architectural Woodwork Standards."
- 2.2 HARDWARE AND ACCESSORIES
- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Butt Hinges: Stainless steel, semi-concealed, five-knuckle hinges complying with ANSI/BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48 inches high, and provide three hinges for doors more than 48 inches high. Manufactured in the United States of America.
1. Basis of Design: Rockford Process Control.
- C. Wire Pulls: Solid stainless steel wire pulls, fastened from back with two screws.
1. Provide two pulls for drawers more than 24 inches wide.
- D. Door Catches: Zinc-plated, nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide two catches on doors more than 48 inches high.**
1. Provide metal chain link catch at all instances where a door swing will project within 1 inch of adjacent cabinet, appliance, wall, or similar.
- E. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.
  2. Drawers: Provide one bumper on back side of drawer front at each corner.
- F. Drawer Slides: ANSI/BHMA A156.9.
1. Heavy Duty (Grade 1HD-100): Side mount.
    - a. Basis of Design: Accuride, Graff, or Knap & Vogt.
    - b. Type: Full extension.
    - c. Material: Steel, ball bearing slides.
  2. General-purpose drawers; provide 150 load capacity.
  3. File drawers; provide 200 lb load capacity.
- G. Label Holders: Stainless steel, or, chrome plated, sized to receive standard label cards approximately 1 by 2 inches, and attached with screws or brads.
1. Provide label holders where indicated.
- H. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with ANSI/BHMA A156.11, Grade 1.
1. Provide a minimum of two keys per lock and six master keys.
  2. Provide locks on every door and drawer.
    - a. Locks shall be stamped with identifying numbers and keys shall be provided by manufacturer and available from a registered locksmith.
    - b. Provide a minimum of two keys per lock and six master keys.
- I. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

- J. Grommets for Cable Passage: 2-inch (51-mm) OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
- K. Wire Management Tray System: Wire mesh cable tray constructed of 5 and 6-mm diameter steel wires, welded on 2-inch by 4-inch (50-mm x 100-mm) intersections with zinc or black powder coat paint finish; install with wire mesh cable tray manufacturer's brackets and hangers as required. Equal to Chatsworth Products, Inc. Ontrac Wire Mesh Cable Tray System.
- L. Wire Management Chase: 2-inch by 2-inch (50-mm x 50-mm) molded plastic wire manager for wire passage; install with mechanical fasteners per manufacturer's recommendations. Paint to match wall finish.
  - M. **Countertop Support Brackets: Open style 1-¼-inch wide x ¼-inch thick welded steel bracket with ¼-inch thick gusset between the support flanges that is positioned with its broad surface showing to the front of the bracket. Design shall allow for installation of wire management tray beneath countertop. Bracket shall have pre-drilled holes for mounting and powder-coat finish. Size shall be determined by depth of countertop. Basis of Design: Knap & Vogt.**
- N. Vinyl Fabric for Display Cases: Mildew resistant, washable, complying with FS CCC-W-408D; weighing not less than 20 oz./sq. yd.; with flame-spread index of 25 or less when tested according to ASTM E 84. Architect will select from manufacturer's full range of colors (minimum 100) of material specified in section 097200 "Wall Coverings" for this project.
- O. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
  - 2. Satin Stainless Steel: BHMA 630.
- P. Concealed Hardware: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- Q. Fasteners used in pressure-preservative-treated lumber shall be hot-dip galvanized or stainless steel.

### 2.3 PLASTIC LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.
  - 1. Provide certificates from AWI certification program indicating that countertops, including installation, comply with requirements of grades specified.
- B. Grade: Custom.
- C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.
  - 1. Manufacturers: Subject to compliance with requirements, Architect shall select from manufacturers' full ranges of standard products by all of the following:
    - a. Arborite; a division of ITW Canada.
    - b. Formica Corporation
    - c. Nevamar Company, LLC; a division of Panolam Industries International Inc.
    - d. Panolam Industries International, Inc.
    - e. Wilsonart International; Div. of Premark International, Inc.
  - 2. Products: Subject to compliance with requirements, Architect shall select from manufacturers' full ranges of standard and made-to-order products by all of the following:
    - a. Arborite; a division of ITW Canada; Arbochem Laminate.
    - b. Formica Corporation; Chemtop2.
    - c. Nevamar Company, LLC; a division of Panolam Industries International Inc.; Chemarmor.
    - d. Panolam Industries International, Inc.; Chemguard.
    - e. Wilsonart International, Div. of Premark International, Inc.; Chemsurf.

**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. As indicated by manufacturer's designations.
2. Match Architect's sample.
3. As selected by Architect from manufacturer's full range in the following categories:
  - a. Solid colors, matte or smooth textured low-sheen finish.
  - b. Wood grains, matte or smooth textured low-sheen finish.
  - c. Patterns, matte or smooth textured low-sheen finish.

E. Edge Treatment for tops and Back- and Side-Splashes: 3-mm PVC edging.

F. Core Material: Particleboard.

G. Core Material at Sinks: Particleboard made with exterior glue or exterior-grade plywood.

H. Core Thickness for Countertops: 1-1/8 inch.

I. Core Thickness for Back- and Side-Splashes: 3/4-inch, maximum.

J. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.4 MATERIALS

A. Composite Wood Products: Products shall be made without urea formaldehyde.

B. Composite Wood Products: Products shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

D. Composite Wood Products: Formaldehyde emission rates shall not be greater than the following:

1. Particleboard: 0.09 ppm.
2. MDF More Than 5/16 Inch Thick: 0.11 ppm.
3. MDF 5/16 Inch or Less in Thickness: 0.13 ppm.

E. Composite Wood Products: Products shall be made without urea formaldehyde.

F. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.

G. Particleboard: ANSI A208.1, Grade M-2.

1. Recycled Content:.

H. MDF: Medium-density fiberboard, ANSI A208.2, [**Grade 130**] <Insert grade>.

1. **Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <Insert value> percent.**

I. Plastic Laminate (General Casework)

1. High-pressure decorative laminate complying with NEMA LD3.
2. Manufacturers: Subject to compliance with requirements, Architect shall select from manufacturers' full ranges of standard products by all of the following:
  - a. Arborite; Wilsonart, Engineered Surfaces.
  - b. Formica Corporation.
  - c. Nevamar Company, LLC; a division of Panolam Industries International, Inc.
  - d. Pionite Surface Systems.
  - e. Wilsonart International.

J. PVC Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3.0 mm thick at doors and drawer fronts, 1.0 mm thick elsewhere.

1. As selected by Architect from the full range of products by all the following manufacturers:



- a. Canplast.
  - b. Charter Industries, L.L.C.
  - c. Doëllken.
  - d. Surteco.
  - e. Wilsonart International.
- K. Thermally Fused Panels (semi-exposed): Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- 1. Edgebanding for Thermally Fused Melamine Panels: PVC or polyester edgebanding matching thermally fused melamine panels.
- L. Glass for Glazed Doors:
- 1. Clear tempered glass complying with ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; not less than 5.0 mm thick.
  - 2. Clear laminated annealed glass complying with ASTM C1172, Kind LA, Condition A, Type I, Class I, Quality-Q3; with two plies not less than 3.0 mm thick and with clear, polyvinyl butyral interlayer.
- M. Architectural Moldings for Millwork:
- 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Brunner Enterprises.
    - b. Eagle Mouldings.
    - c. Monarch Metals, Inc.
    - d. Orange Aluminum.
  - 2. **Reveal Molding: Anodized aluminum channel for reveals in dimensions as indicated on Architectural drawings. Eagle Mouldings, Channels or Architect approved equal. Finish shall be as selected by Architect from manufacturer's full range of anodized finishes**
  - 3. Outside Corner Molding: Anodized aluminum 90-degree corner trim for outside corners in dimensions as indicated on Architectural drawings. Eagle Mouldings Out Corners or Architect approved equal. Finish shall be as selected by Architect from manufacturer's full range of anodized finishes.
  - 4. Divider Molding: Anodized aluminum divider trim for panel joints in dimensions as indicated on Architectural drawings. Eagle Mouldings, Dividers or Architect approved equal. Finish shall be as selected by Architect from manufacturer's full range of anodized finishes.
- N. Adhesives: Do not use adhesives that contain urea formaldehyde.
- O. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- P. Adhesives: Do not use adhesives that contain urea formaldehyde.
- 2.5 FABRICATION
- A. Plastic-Laminate-Clad Cabinet Construction: As required by referenced quality standard, but not less than the following:
- 1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard.
  - 2. Shelves: 1-inch thick particleboard, plastic-laminate faced.
  - 3. Backs of Casework: 1/2-inch- thick particleboard or MDF where exposed, 1/4-inch- thick hardboard dadoed into sides, bottoms, and tops where not exposed.
  - 4. Drawer Fronts: 3/4-inch particleboard.
  - 5. Drawer Sides and Backs: 1/2-inch- thick particleboard or MDF, with glued dovetail or multiple-dowel joints.

6. Drawer Bottoms: 1/4-inch- thick particleboard or MDF glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
7. Cabinet Doors:
  - a. 48 Inches (1220 mm) High or Less: 3/4 inch thick, with particleboard or MDF cores.
  - b. 48 Inches (1220 mm) or More in Height: 1-1/16 inches thick, with solid hardwood stiles and rails and honeycomb 1-1/8 inches thick, with particleboard cores.
8. Stiles and Rails of Glazed Doors:
  - a. 48 Inches (1220 mm) High or Less: 3/4 inch thick, with particleboard cores.
  - b. 48 Inches (1220 mm) or More in Height: 1-1/8 inches thick, with particleboard cores.
9. Paper Storage Drawers: Construct paper drawers with retain hood at the rear of the drawer.
  - B. Filler Strips: Provide as needed to close spaces between casework and walls, ceilings, and equipment. Fabricate from same material and with same finish as casework.**

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Grade: Install casework to comply with same quality standard grade as item to be installed.
- B. Install casework level, plumb, and true in line; shim as required using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch. Bolt adjacent cabinets together with joints flush, tight, and uniform.
  1. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24 inches (600 mm) o.c.
  2. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 16 inches (400 mm) o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten cabinets to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
- E. Fasten casework to adjacent units and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Adjust operating hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- H. Side edge of countertop at end of run of base cabinets must extend 1/2" beyond the base cabinet.
- I. Where base cabinet meets a wall or a tall cabinet, a side splash must be installed.**
- J. Protective surface material must be applied to all horizontal countertop surfaces and edges, to prevent scratches and damage from all trades, until final project completion.

3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
  - 1. Inspection entity to prepare and submit report of inspection.

3.4 CLEANING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- C. Keys and Accessories: All keys and loose accessories items shall be tagged with identification, boxed, listed and turned over to the Owner at the completion of the work.

END OF SECTION 123216

**Part III: Bid Cost Form**  
**ITB #21367 Davis Aerospace & Maritime School Ground Floor Renovation**

The Bidder proposes to furnish all labor, materials, and equipment necessary to complete Davis Aerospace & Maritime Ground Floor Renovation. The undersigned proposes to renovate the ground floor of Davis Aerospace & Maritime School for the District in accordance with the Specifications and to the entire satisfaction of, and acceptance by, the District and for the following prices. The Agreement will begin **December 1, 2022** pending authorization of funds at the discretion of the District.

The Architect’s opinion of probable cost of construction, for base bid is \$500,000.

**Base Bid:** Unless otherwise noted, all work indicated on the drawings and/or described in this project manual for Base Bid. The work includes, but is not limited to selective demolition, general trades, electrical, mechanical, plumbing, fire protection, and technology. Base bid shall consist of furnishing all materials, equipment, labor, and services to perform all work. Base bids should not include alternate items for additional work.

Materials: \$ \_\_\_\_\_  
 Labor: \$ \_\_\_\_\_  
 \_\_\_\_\_  
 Total Sum: \$ \_\_\_\_\_

**Alternate Base Bid:** Furnish all materials and labor to complete this work as indicated on the drawings and described in the project manual

Materials: \$ \_\_\_\_\_  
 Labor: \$ \_\_\_\_\_  
 \_\_\_\_\_  
 Total Sum: \$ \_\_\_\_\_

**Schedule:**

Date to Begin Construction:

Event:	Date:

**Substitutions:** Bidder is to list here any “Substitutions” for which consideration is desired, showing the addition or reduction in price to be made, for each, if the substitution is accepted, or stated “No Change in Price”, if none is provided. Submission of proposed substitution for approval, whether for savings in cost or improvement in construction is encouraged.

Substitutions are for consideration of inclusion only. The District has the right to require all work to conform to the Specifications issued.

Branded or Make Specified	Proposed Substitutions	Add	Deduct

**Unit Prices:**

The Base Bid is a lump sum for furnishing the necessary labor, materials, equipment and performing all work required by the drawings and specifications. The Owner reserves the right to increase or diminish the work or to omit any one or more items as it may deem desirable. Unit prices indicated below will be utilized as a basis for progress payments and as a basis of adjusted remuneration for any authorized increase or decrease in the scope of work. These unit prices must be filled in and accompany the proposal and the total sum of all the amounts resulting from the quantities multiplied by their unit prices. The Contractor shall be responsible for all quantities and should make his own calculation.

ITEM DESCRIPTION	QUANTITIES	UNIT	UNIT COST	TOTAL



**Vendors are required to complete the signatory section below.**

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Appendix A: District Related Forms**  
**Addendum Acknowledgement Form for ITB #21367**

Having read and examined the Request for Proposal Documents, including the specifications, prepared by the Cleveland Metropolitan School District for the above-referenced Project, and the following Addenda:

Addendum Number	Date of Receipt
_____	_____
_____	_____
_____	_____
_____	_____

Bidder: \_\_\_\_\_.

The undersigned Vendor proposes to perform all work for the applicable contract, in accordance with the contract document for the proposed sums.

***Failing to acknowledge a published Addendum may cause your bid to be rejected.***

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# Certificate of Debarment



## Certification Regarding Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 13 CFR Part 145. The regulations were published as Part VII of the May 26, 1988 *Federal Register* (pages 19160-19211). Copies of the regulations are available from local offices of the U.S. Small Business Administration.

### (BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective primary participant certifies to the best of its knowledge and belief that it and its principals:
  - (a) Are not presently debarred, suspended, proposed for disbarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
  - (b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
  - (d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default.
- (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective primary participant shall attach an explanation to this proposal.

Business Name \_\_\_\_\_

Date \_\_\_\_\_

By \_\_\_\_\_

Name and Title of Authorized Representative

\_\_\_\_\_  
Signature of Authorized Representative



## Certificate of Debarment Pg. 2

- 2 -

### INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to which this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations (13 CFR Part 145).
6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the ineligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

# Conflict of Interest Form

## Statement of Potential Conflicts of Interest

Vendor Name:	Primary Contact:
Address 1:	Telephone #:
Address 2:	Fax #:
City:	Email:
State, Zip:	Website:

Cleveland Metropolitan School District (CMSD) adheres to Ohio Ethics Law and strictly follows the opinion of the Ohio Ethics Commission. As such, each vendor is requested to submit this statement declaring any potential conflicts of interest in doing business with the District. Please answer the following two questions providing all requested information.

1. Are any current Cleveland Metropolitan School District (CMSD) employees, Cleveland Board of Education members, or any of their immediate family members, also members of the vendor's board of directors, hold any officer position with the vendor, or own any shares of any stock issued by the vendor?

Yes \_\_\_\_\_ No \_\_\_\_\_

If **Yes**, and if the CMSD employee, CMSD board member, or immediately family member is a member of the vendor's board of directors or holds an office with the vendor, please state the person's name and position with the vendor.

Name: \_\_\_\_\_

Position: \_\_\_\_\_

If **Yes**, and if the CMSD employee, CMSD board member, or immediate family member owns share of any stock in the vendor organization or company, state the percentage of all outstanding company shares owned by the CMSD employee or board member.

\_\_\_\_\_ %

2. Are any current CMSD employees, CMSD board members, or any immediate family members also employees of the vendor?

Yes \_\_\_\_\_ No \_\_\_\_\_

If **Yes**, please state the person's name and provide a description of their job duties for the provider:

Name: \_\_\_\_\_

Job Duties: \_\_\_\_\_

If **Yes**, please describe the contact that the vendor will have with the CMSD employee or CMSD board member in the course of providing services to the District:

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**CERTIFICATION**

I do hereby certify that the foregoing statements are true and accurate, and that my signature below attests to the authenticity of my identity as the person actually signing this form. This document is not a contract. In order for a binding Agreement to exist, a signed Agreement will be required prior to any legally binding commitment by the District.

**NOTARIZED STATEMENT**

\_\_\_\_\_ being duly sworn and deposes says

That he/she is the \_\_\_\_\_ of  
(title)

\_\_\_\_\_, and answers to all the  
(organization)  
foregoing questions and all statements therein contained are true and correct.

\_\_\_\_\_  
(signature)

Subscribed and sworn before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_

## Bidder Qualifications Form

Bidder must answer all questions or attach a written explanation for each question.

PROPOSER NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY; STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_

TITLE: \_\_\_\_\_

TELEPHONE: ( ) \_\_\_\_\_ TOLL FREE: ( ) \_\_\_\_\_

TAXPAYER IDENTIFICATION NUMBER: \_\_\_\_\_

1. What type of organization? (i.e. corporation, partnership, etc.)
  
2. How many years has your organization been in business?
  
3. How many years has your organization been in business under its current name?
  
4. List any other aliases your organization has utilized in the last two years and the form of Business
  
5. If you are currently a corporation, list the following:
  - a. State of incorporation
  
  - b. Date of incorporation
  
  - c. President's name
  
  - d. Secretary's name
  
  - e. Treasurer's name
  
  - f. Statutory agent's name

- g. Name of shareholders, if less than 10
  - h. Principal place of doing business
6. If you are currently in a partnership, list the following:
    - a. Name and address of all general and limited partners.
  
    - b. Original name and date of organization's inception
  7. If you are neither a corporation nor a partnership, please describe your organization and list principals.
  8. Are you legally qualified to do business in the State of Ohio?
  9. Are you legally qualified to do business in Cuyahoga County and licensed by the City of Cleveland?
  10. Has your organization ever been (i) declared by a customer to be in default under a contract and/or (ii) sued by a customer for failure to completely a contract or properly perform services in a timely manner? If yes, please state where, when, and why.
  11. Has your organization ever been cited by a local, county, state, or federal authority for violation of a regulation or statute or failing to timely complete a contract in accordance with specifications? If yes, please state date, agency, and final disposition.
  12. Has your organization ever filed for bankruptcy? If yes, please state where, when and why?
  13. On a separate sheet, list the major customers for whom your organization has provided this type of equipment or service in the past five years. Include owner's name and type of work performed.
  14. Has your organization ever been sued by a supplier for failure to timely pay for materials or equipment provided? If yes, please provide details.
  15. What is the dollar limit of your firm's General (CLS) Liability Insurance?

Name of insuring company: \_\_\_\_\_

Policy number: \_\_\_\_\_

16. What is the dollar limit of your firm's Automotive Liability Insurance?

Owned vehicles \_\_\_\_\_

Non-Owned vehicles \_\_\_\_\_

Name of insuring company \_\_\_\_\_

Policy number \_\_\_\_\_

17. List the name and address of every person having an interest in this ITB.

18. Has any federal, state or local government entity ever cited or taken any action against your organization or any of its principals for failure to pay or remit any taxes including but not limited to income, withholding, sales, franchise, or personal property taxes? If yes, please give name of agency, date and amount of taxes overdue and resolution of the issue.

19. Is your organization and its' principals current in payment of personal property taxes?

20. The prospective lower tier participant certifies, by submission of this ITB, that neither it nor its principals is presently debarred, suspended, proposed, for debarment or suspension, declared ineligible, or voluntarily excluded from participation in this transaction by any State and/or Federal Department or Agency.

21. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participants shall attach an explanation to this ITB.

## Notarized Statement

\_\_\_\_\_ being duly sworn and deposes says

that he/she is the \_\_\_\_\_ of  
(title)

\_\_\_\_\_, and answers to all the  
(organization)

foregoing questions and all statements therein contained are true and correct.

\_\_\_\_\_  
(signature)

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_



**Non-Collusion Affidavit**

This Affidavit must be executed and shall accompany the proposal in order for the proposal to be considered.

NON-COLLUSION AFFIDAVIT  
State of Ohio, Cuyahoga County

\_\_\_\_\_, being first duly sworn, deposes and says that

he/she is \_\_\_\_\_ of \_\_\_\_\_

of the party making the foregoing proposal; that such proposal is genuine and not collusive or sham; that said proposer has not colluded, conspired, connived, or agreed, directly or indirectly, with any proposer or person, to put in a sham proposal, or that such other person shall refrain from proposing, and has not in any manner, directly or indirectly sought by agreement or collusion, or communication or conference, with any person, to fix the proposal price of affiant or any other proposer, to fix any overhead, profit or cost element of said proposal price, or of that of any proposer, or to secure any advantage against the Board of Education of the Cleveland Metropolitan School District, or any person or persons interested in the proposal; and that all statements contained in said proposal are true; and further that such proposer has not, directly or indirectly, submitted this proposal, or the contents thereof, or divulged information or data relative thereto to any Association or to any member or agent thereof.

\_\_\_\_\_  
Affiant

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public in and for Cuyahoga County, Ohio

My commission expires: \_\_\_\_\_

## Diversity Business Enterprise Forms

Information about the District's Diversity Business Enterprise Program can be found at <https://bit.ly/3wvVApK>.

### DBE Form A

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Type of Business (Product or Service): \_\_\_\_\_

\_\_\_\_\_

Date of Proposed Contract Award: \_\_\_\_\_

Amount of Proposed Contract Award: \_\_\_\_\_

Diversity Business Enterprise Subcontractor(s):

\_\_\_\_\_

Dollar Amount Subcontract Award: \_\_\_\_\_

Percent of Subcontract Award: \_\_\_\_\_

D.B.E. Participation: \_\_\_\_\_ \$ \_\_\_\_\_

F.B.E. Participation: \_\_\_\_\_ \$ \_\_\_\_\_

Name of EEO Officer: \_\_\_\_\_

\_\_\_\_\_

(Signature of owner, partner, or authorized officer)

Name: \_\_\_\_\_ Dated: \_\_\_\_\_

(printed)

Title: \_\_\_\_\_

DO NOT COMPLETE BELOW THIS LINE

\_\_\_\_\_

Compliant     Compliance Pending     Non-Compliant

Compliance Date: \_\_\_\_\_

\_\_\_\_\_

(signature, DBE Department)

\_\_\_\_\_

(date)

## DBE Form B

### NOTICE OF REQUIREMENT TO ENSURE DIVERSITY BUSINESS ENTERPRISE (DBE) OPPORTUNITY

Note: All eligible proposers for award of the contract should comply with the Requirements, Terms, and Conditions of this Notice.

The undersigned proposer hereby agrees that the goal it has established for DBE participation in this project through either subcontracting or entering into a joint Venture with DBEs in conformity with the Requirements, Terms and Conditions of this Notice is a goal of thirty (30%) percent for a construction/repair/ maintenance contract, twenty (20%) percent for a supply contract, and fifteen (15%) for a service contract of the total contract amount of this project. In no event will the absence of goals as stated above be deemed as compliance with the requirements, terms and conditions of this notice.

In addition, the undersigned will complete and attach hereto the DBE (Form C) Schedule for DBE participation, showing all DBE/FBE that will participate as subcontractors or joint ventures in this contract and a DBE (Form D), DBE Letter of Intent form for each DBE/FBE listed on the Schedule.

Proposer: \_\_\_\_\_

Date: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

#### Definition of DBE: A Diversity Business Enterprise (DBE)

"Small Diversity business concern" means a small business concern that is at least (51) percent unconditionally owned by one or more individuals who are both socially and economically diverse, or a publicly owned business that has at least (51) percent of its stock unconditionally owned by one or more socially and economically diverse individuals and that has its management and daily business controlled by one or more such individuals. This term also means a small business concern that is at least (51) percent unconditionally owned by an economically diverse Indian tribe or Native Hawaiian Organization, or a publicly owned business that has least (51) percent of its stock unconditionally owned by one of these entities, that has its management and daily business controlled by members of an economically diverse Indian tribe or Native Hawaiian Organization.

**DBE Form C**

**SCHEDULE MBE/FBE PARTICIPATION**

Project Name: \_\_\_\_\_

Name of Non-DBE Contractor: \_\_\_\_\_

Identification Number: \_\_\_\_\_

Location: \_\_\_\_\_

Name of Minority Contractor: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Type of work to be performed and work hours involved:

\_\_\_\_\_

Projected commencement and completion dates for work:

\_\_\_\_\_

Agreed price in dollars or percentage:

\_\_\_\_\_

The undersigned will enter into a formal agreement with DBE for work listed in this schedule conditioned upon execution for a contract with the Cleveland Municipal School District

**TO BE RETURNED WITH THE PROPOSAL**

\_\_\_\_\_  
Signature of Non-DBE Prime Contractor

Date: \_\_\_\_\_

**DBE Form D**

**DBE LETTER OF INTENT**

To: \_\_\_\_\_  
*Non-DBE Prime or General Proposer*

Project: \_\_\_\_\_

**NON-DBE PRIME OR GENERAL PROPOSER**

The Undersigned intends to perform work in connection with the above-referenced project as (check one):

an individual     a corporation     a partnership     a joint venture

DBE status of the undersigned is confirmed in the Cleveland Municipal School District's DBE file of bona fide enterprises with a certification date of: \_\_\_\_\_

The Undersigned is prepared to perform the following described work in connection with the above referenced project. Specify in detail particular work items or parts thereof to be performed:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

at the following price or percent of contract: \$ \_\_\_\_\_

You have projected the following commencement date of such work, and the undersigned is projecting completion of such work as follows:

**Items** \_\_\_\_\_

**Projected Commencement Date** \_\_\_\_\_

**Projected Completion Date** \_\_\_\_\_

\_\_\_\_\_ % (percent) of the dollar value of the subcontract will be sublet and/or awarded to NON-DBE contractor (s) and/or NON-FBE SUPPLIERS. The undersigned will enter into a formal agreement for the above work with you conditioned upon your execution of a contract with the Cleveland Municipal School District.

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Name of DBE Firm (where applicable)**

\_\_\_\_\_  
Signature of DBE (where applicable)

\_\_\_\_\_  
Signature of MBE Firm

(TO BE RETURNED WITH ITB)

\_\_\_\_\_  
**Name of FBE Firm**

\_\_\_\_\_  
**Signature of FBE Firm**

**DBE Form E**

**DBE Unavailability Certification**

I, \_\_\_\_\_, \_\_\_\_\_  
*Name Title*

Of \_\_\_\_\_, certify that on \_\_\_\_\_  
*Date*

I contacted the following DBE to obtain a Proposal for work items to be performed on:

Board Project: \_\_\_\_\_

Minority Contractor: \_\_\_\_\_

Work Items Sought: \_\_\_\_\_

Form of Proposal Sought: \_\_\_\_\_

Female Contractor: \_\_\_\_\_

Work Items Sought: \_\_\_\_\_

Form of Proposal Sought: \_\_\_\_\_

To the best of my knowledge and belief said minority business enterprise was unavailable (exclusive of the unavailability due to lack of agreement on price) for work on this project or unable to prepare a proposal for the following reason (s):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
*Signature, Non-DBE prime Proposer Date*

\_\_\_\_\_ was offered an opportunity to proposal on the above-referenced work on \_\_\_\_\_  
\_\_\_\_\_ by \_\_\_\_\_  
*Date Non-DBE Prime Proposer*

\_\_\_\_\_  
*Signature, Non-DBE Prime Proposer*

The above statement is a true and accurate account of why I did not submit a Proposal on this project.

\_\_\_\_\_  
*Signature, Non-DBE prime Proposer*



## DBE Form G

This form need not be completed if all joint venture firms are diversity business enterprises

1. Name of Joint Venture: \_\_\_\_\_
2. Address of Joint Venture: \_\_\_\_\_
3. Phone Number of Joint Venture: \_\_\_\_\_
4. Identify the firms which comprise this joint venture. (The DBE partner must complete DBE Form A or have current DBE Certification)

---

---

a. Describe the roll of the DBE firm in the joint venture: \_\_\_\_\_

---

b. Describe briefly the experience and business qualifications of each non-DBE Joint Venture: \_\_\_\_\_

---

5. Nature of Joint Venture's Business: \_\_\_\_\_

---

6. Provide a copy of the Joint Venture Agreement.

7. What is the percentage of DBE Ownership? DBE \_\_\_\_\_% FBE \_\_\_\_\_%

8. Ownership of Joint Venture: (This need not be completed if described in the Joint Venture agreement provided in response to question 6).

a. Profit and loss sharing: \_\_\_\_\_

---

b. Capital contributions, including equipment: \_\_\_\_\_

---

c. Other applicable ownership interest: \_\_\_\_\_

---



9. Control of and participation in this contract. Identify by name, race, and "firm" those individuals and their titles who are responsible for day-to-day management and policy decision making, including, but not limited to, those prime responsibility form:

a. Financial decisions: \_\_\_\_\_

\_\_\_\_\_

b. Management decisions, such as:

i. Estimating: \_\_\_\_\_

ii. Marketing and Sales: \_\_\_\_\_

iii. Hiring and firing of management personnel: \_\_\_\_\_

\_\_\_\_\_

iv. Purchasing of major items or supplies: \_\_\_\_\_

\_\_\_\_\_

c. Supervision of field operations: \_\_\_\_\_

\_\_\_\_\_

Note: If after complete the DBE Form B and before the completion of the joint venture's work on any contract awarded, there is any significant change in the information submitted, the joint venture must inform the Cleveland Municipal School District, either directly or through the non-DBE prime subcontractor if the joint vendor is a subcontractor.

**DBE Form H**

**Non-Minority Prime Affidavit (Joint Venture)**

**STATE OF OHIO**

**CUYAHOGA COUNTY**

**AFFIDAVIT**

The undersigned swear that the forgoing statements are correct and include all material information necessary to identify and explain the items and operation of our subcontract and the intended participation by each joint venture in the undertaking. Further, the undersigned covenant and agree to provide to the Cleveland Municipal School District current, complete, and accurate information regarding actual joint venture work and the payments thereof and any proposed changes in any of the subcontract arrangements and to permit the audit and examination of the books, records and files of the joint venture or those of each party relevant to the joint venture, by authorized representatives of the Cleveland Municipal School District. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under federal and state laws concerning false statements.

\_\_\_\_\_  
*Name of Firm (Prime)*

\_\_\_\_\_  
*Name of Firm (DBE)*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Name and Title*

\_\_\_\_\_  
*Name and Title*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Date*

STATE OF \_\_\_\_\_ ] COUNTY OF \_\_\_\_\_ ]SS.

On this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_ , before me appeared \_\_\_\_\_, to me personally known, who being duly sworn, did execute the foregoing affidavit, and did state that they were properly authorized by \_\_\_\_\_ to execute the affidavit and did so as their free act and deed.

*(Seal)*

\_\_\_\_\_  
Notary Public

\_\_\_\_\_  
*Commission expires*

## EOA Contractual Declaration Forms

Information about the District's Affirmative Action Program can be found at <https://bit.ly/3wvVApK>.

### Service Provider Contract Compliance Form

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip Code: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Standard Metropolitan Statistical Area: \_\_\_\_\_

Recruitment Area: \_\_\_\_\_

Type of Business (product or service): \_\_\_\_\_

Name of EEO Officer: \_\_\_\_\_

Signature of Owner, Partner, or Authorized Officer: \_\_\_\_\_

Name (type or print): \_\_\_\_\_

Date: \_\_\_\_\_ Title: \_\_\_\_\_

Do not complete below this line

---

Status of Vendor:

Compliance

Conditional Compliance

Non-Compliance

Compliance Pending

Comments: \_\_\_\_\_

Date: \_\_\_\_\_ Signature: \_\_\_\_\_



## Employment Data Form

Please note this data may be obtained by visual survey or post-employment record. Neither visual surveys nor post-employment records are prohibited by any federal, state or local law. All specified data is required to be filled in by District policy.

Job Categories	All EMPLOYEES			MALES					FEMALES				
	TOALS MALES & FEMALES	MALES	FEMALES	WHITE (NOT OF HISPANIC ORIGIN)	BLACK (NOT OF HISPANIC ORIGIN)	ASIAN AMERICAN OR PACIFIC ISLANDER	AMERICAN INDIAN OR ALSKAN NATIVE	HISPANIC	WHITE (NOT OF HISPANIC ORIGIN)	BLACK (NOT OF HISPANIC ORIGIN)	ASIAN AMERICAN OR PACIFIC ISLANDE	AMERICAN INDIAN OR ALSKAN NATIVE	HISPANIC
OFFICIALS, MGRS & SUPERVISORS													
PROFESSIONALS													
TECHNICIANS													
SALES WORKERS													
OFFICE/CLERICAL													
CRAFTWORKERS (SKILLED)													
OPERATIONS (SEMI-SKILLED)													
LABORERS (UNSKILLED)													
SERVICE WORKERS													
APPRENTICES													
TOTAL													

**Additional information (optional):**

Describe any other actions taken which show that all employees are recruited, hired, or trained or promoted without regard to their race, religion, color, sex, handicap, age or national origin. Use second sheet if additional space is needed:

The undersigned certifies that they are legally authorized by the proposer to make the statements and representations contained in this report, and that they have read all of the foregoing statements and representations which are true and correct to the best of their knowledge and belief.

FIRM OR CORPORATE NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TITLE: \_\_\_\_\_

## References

Include below three references of equal or larger size to this current ITB project. Public sector experience is preferred, but not required. Please attach relevant supporting documentation, such as project plans, scope of work.

### **Reference #1:**

Company/School Name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of Business: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Telephone and Fax#: \_\_\_\_\_

Dates of Service: \_\_\_\_\_

Description of Services Provided: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### **Reference #2:**

Company/School Name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of Business: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Telephone and Fax #: \_\_\_\_\_

Dates of Service: \_\_\_\_\_

Description of Services Provided: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Reference #3:**

Company/School Name: \_\_\_\_\_

Address: \_\_\_\_\_

Type of Business: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Telephone and Fax#: \_\_\_\_\_

Dates of Service: \_\_\_\_\_

Description of Services Provided: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix B: Service Provider Checklist

To assist service providers in the preparation of their proposals to ensure compliance with all document requirements

- Cover Page
- Transmittal Cover Letter, signed
- Table of Contents
- Bid Cost Form
  - Signatory
- District Related Forms
  - Addendum Acknowledgement, checked: <https://www.clevelandmetroschools.org/purchasing> for any addendums
  - Certificate of Debarment
  - Conflict of Interest
  - Bidder Qualification Form
  - Non-Collusion Affidavit
  - DBE Forms- A, B, C, D, E, F, G, & H, for more information: <https://bit.ly/3wvVApK>
  - EOA Contractual Declaration Forms 1 &2, for more information: <https://bit.ly/3wvVApK>
  - Employment Data Form
  - References
- Bid Guaranty

### Copies

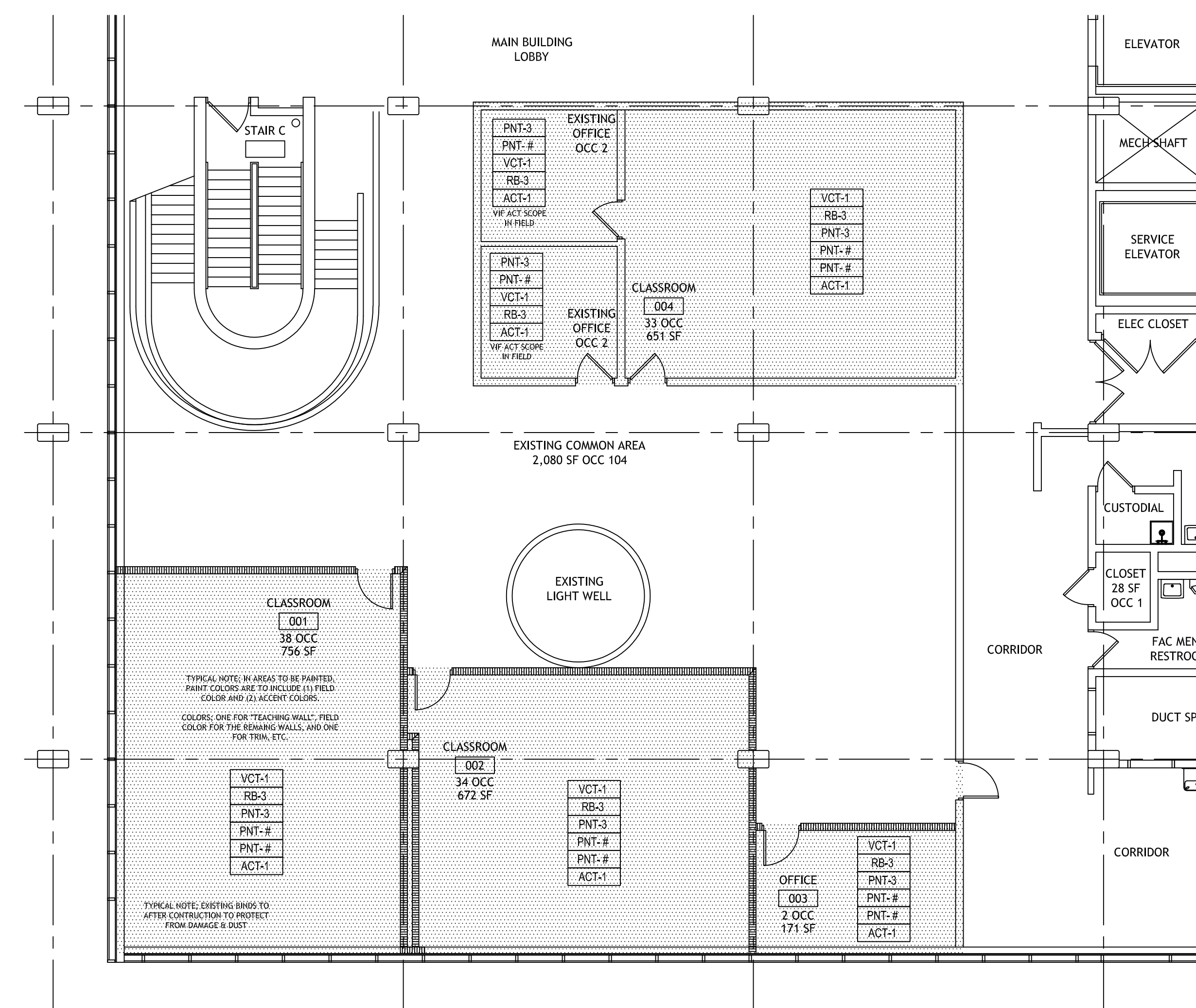
- Original, marked
- Copies (1), marked
- USB B/Flashdrive



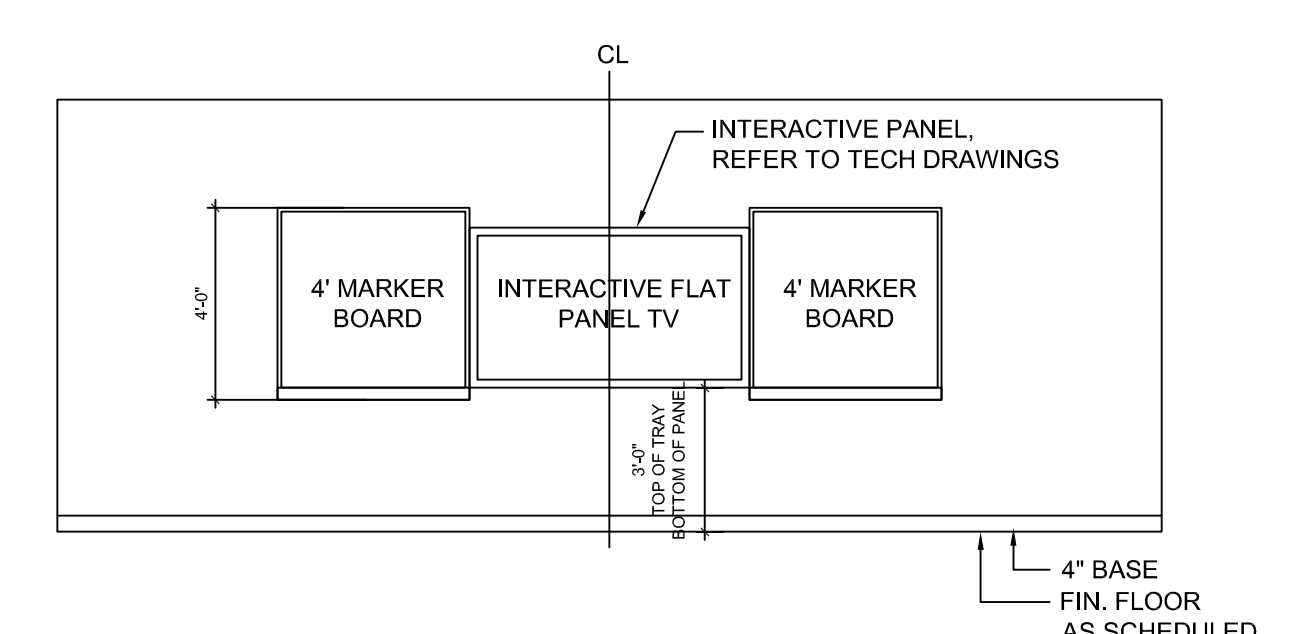




ROOM FINISH KEY			
FLOORS	BASE	WALLS	MISCELLANEOUS
EXISTING	EXISTING	PNT-5 PAINT - CEILING MANUFACTURER: SHERWIN WILLIAMS COLOR: SW709 EXTRA WHITE FINISH: (1) COAT LATEX PRIMER, (2) COATS LATEX FLAT WALL PAINT	PL-1 PLASTIC LAMINATE - CASEWORK MANUFACTURER: WILSONART COLOR: 107766 KENSINGTON MAPLE 3MM PVC KENSINGTON MAPLE
CPT-1 CARPET - MODLAR MANUFACTURER: MOHAWK PATTERN: HEM GT295 COLOR: 085 BUCKOUT SIZE: 12' X 36' INSTALLATION: VERTICAL ASHLAR	RB-1 RUBBER BASE MANUFACTURER: JOHNSONITE STYLE: COVE COLOR: 485 SEAFARER SIZE: 4" HIGH COIL	CEILING & TRIM	PL-2 PLASTIC LAMINATE - COUNTERTOPS MANUFACTURER: FORMICA COLOR: 861456 DRUM TWEEL 3MM PVC DOELLEN COLOR: BRITANNY BLUE
CS CONCRETE, SEALED	RB-2 RUBBER BASE MANUFACTURER: JOHNSONITE STYLE: COVE COLOR: TB1 FLAME SIZE: 4" HIGH COIL	ACT-1 ACOUSTICAL CEILING TILE MANUFACTURER: UEG STYLE: RADAR CLIMAPLUS - HIGH NRC, HIGH CRC ITEM 2041 EDGE: SQUARE COLOR: WHITE SIZE: 24" X 48"	PL-3 PLASTIC LAMINATE - CASEWORK MANUFACTURER: WILSONART COLOR: 107766 KENSINGTON MAPLE 3MM PVC KENSINGTON MAPLE
RAF-1 RESILIENT ATHLETIC FLOORING MANUFACTURER: TARNETT SPORTS PATTERN: OMINISPORTS 8.1 COLOR: WOOD, GREY MAPLE	RB-3 RUBBER BASE MANUFACTURER: JOHNSONITE STYLE: COVE COLOR: 3122 PHYR SIZE: 4" HIGH COIL	MISCELLANEOUS	PL-4 PLASTIC LAMINATE - COUNTERTOPS MANUFACTURER: WILSONART COLOR: 488548 FORGED STEEL 3MM PVC DOELLEN COLOR: SLATE GREY
RAF-2 RESILIENT ATHLETIC FLOORING MANUFACTURER: TARNETT SPORTS PATTERN: OMINISPORTS 8.3 COLOR: SOLID, ROYAL BLUE	RB-4 RUBBER BASE MANUFACTURER: JOHNSONITE STYLE: COVE COLOR: 56 SILVER GREY SIZE: 4" HIGH COIL	WC-1 WALLCOVERING 1 TACKBOARD MANUFACTURER: POROSEAL PATTERN: DESERT SAND COLOR: FOG S2141	DOORS
RAF-3 RUBBER ATHLETIC TILE MANUFACTURER: ROPPE PATTERN: RIGOL COLOR: 378 COBALT/LIGHT GRAY SIZE: 36" X 36"	WALLS	WS-1 WINDOW SHADES MANUFACTURER: TEB STYLE: MANUAL ROLLER SHADES FASCIA COLOR: TEB SHADE/CLOTH COLOR: TEB BASKET WEAVE 5300, RIBBES (3/SLOPE) SHADE/CLOTH COLOR: TEB	PROVIDE WOOD DOORS TO MATCH EXISTING - WOOD TYPE AND FINISH.
VCT-1 VINYL COMPOSITION TILE MANUFACTURER: ARMBROOKS PATTERN: STANDARD EXOLON COLOR: 51803 PEARL, WHITE SIZE: 12" X 12" INSTALLATION: LINEAR	PNT-1 PAINT: ACCENT MANUFACTURER: SHERWIN WILLIAMS COLOR: SW629 SCANDIA FINISH: (1) COAT LATEX PRIMER, (2) COATS LATEX EGGSHELL WALL PAINT		
	PNT-2 PAINT: ACCENT MANUFACTURER: SHERWIN WILLIAMS COLOR: SW624 PONSETTA FINISH: (1) COAT LATEX PRIMER, (2) COATS LATEX EGGSHELL WALL PAINT		
	PNT-3 PAINT: FIELD MANUFACTURER: SHERWIN WILLIAMS COLOR: SW671 POPULAR GRAY FINISH: (1) COAT LATEX PRIMER, (2) COATS LATEX EGGSHELL WALL PAINT		
	PNT-4 PAINT: DOOR FRAMES MANUFACTURER: SHERWIN WILLIAMS COLOR: SW672 VERSATILE GRAY FINISH: (1) COAT LATEX PRIMER, (2) COATS LATEX SEMI-GLOSS WALL PAINT		

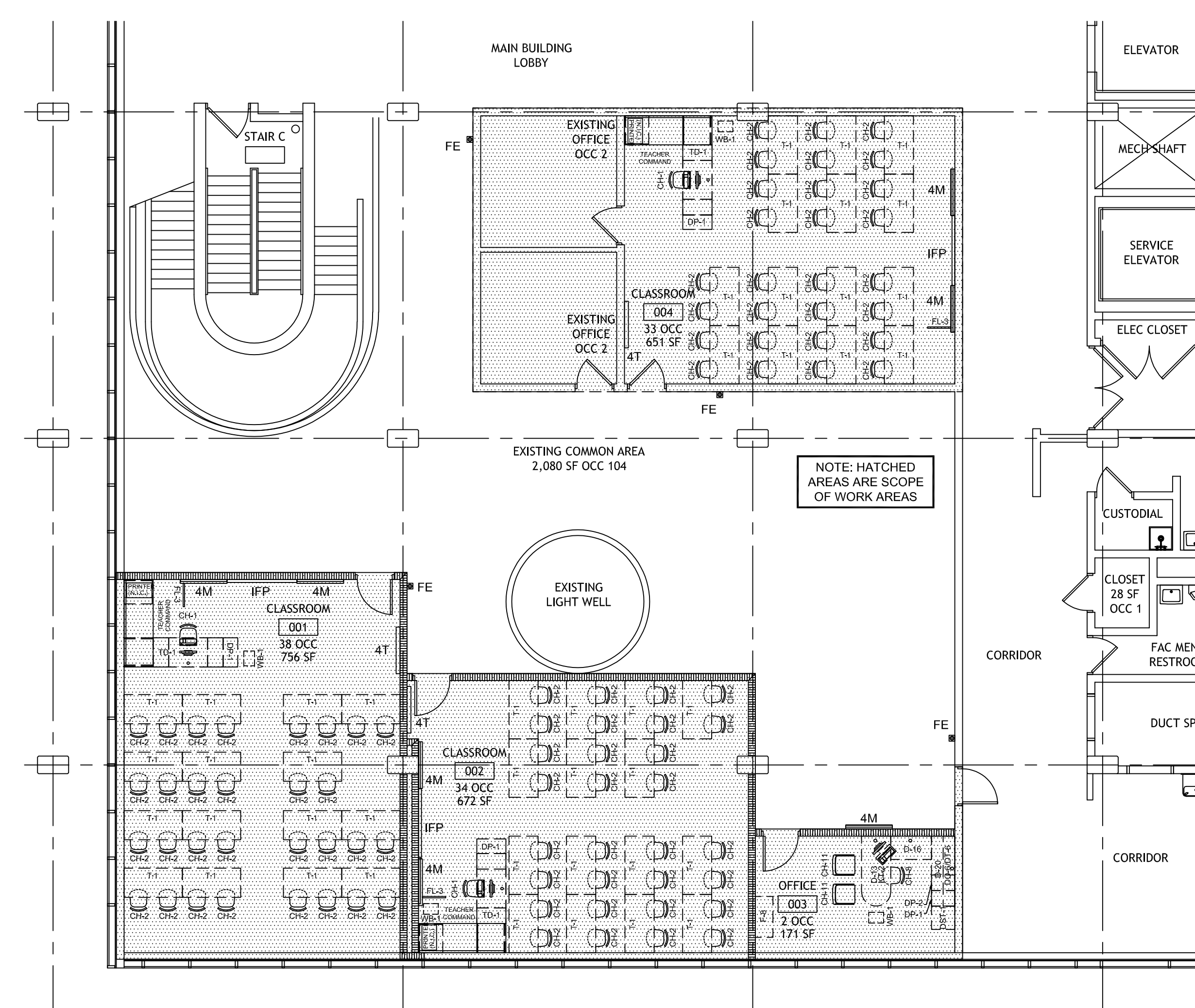


**2** GROUND FLOOR FINISHES PLAN  
A2 1/8" = 1'-0"



**3** EXAMPLE CLASSROOM ELEVATION  
A2 SCALE: 1/4" = 1'-0"

- MILLWORK NOTES**
- ITEMS DETAILED ON THIS DRAWING REFER TO SPECIFICATION SECTION 064023 "INTERIOR ARCHITECTURAL WOODWORK".
  - PROVIDE GROMMETS AT WORKSURFACES WHERE INDICATED IN PLAN.
  - PROVIDE LOCKS ON ALL CABINETS, WHICH SHALL BE KEYPED ALIKE BY GRADE LEVEL OR DEPARTMENT.
  - PROVIDE SUPPORT BRACKETS WHERE REQUIRED.
  - PROVIDE CLEAR SEALANT AT ALL JOINTS BETWEEN COUNTERTOPS, BACKSPLASHES, AND ADJOINING SURFACES.
  - PROVIDE HIGH-PRESSURE NON-DECORATIVE BACKER SHEET ON ALL CONCEALED SURFACES.
  - PROVIDE PVC EDGEBANDING ON ALL COUNTERTOP, DRAWER, DOOR, SHELF, AND BODY FRONT EDGES.
  - PROVIDE WALL SUPPORT AS REQUIRED TO INSTALL WALL-MOUNTED DEVICES, EQUIPMENT AND CASEWORK.
  - INDICATES FINISHED ENDS ON MILLWORK
  - PAPER TOWEL DISPENSER - HEIGHT VARIES ABOUT ELEVATIONS.
  - SOAP DISPENSER



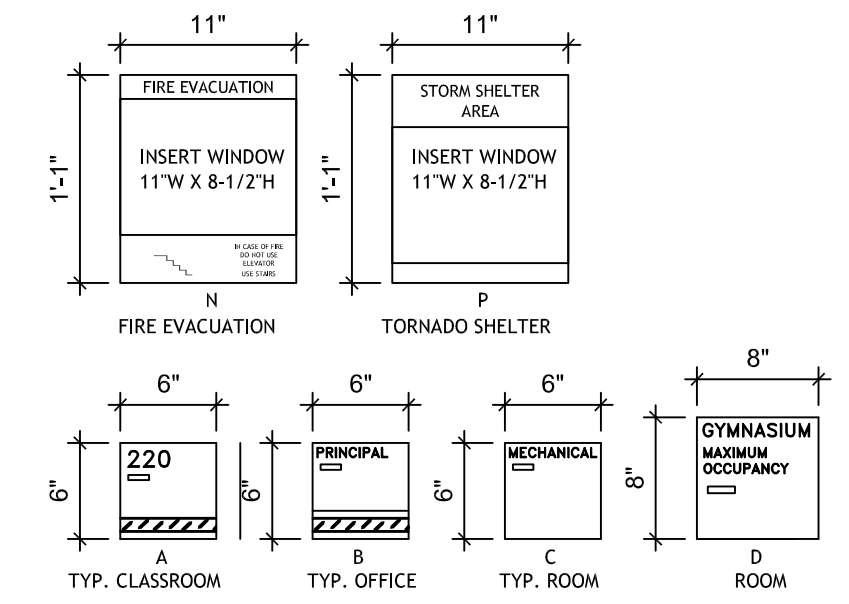
**1** GROUND FLOOR FINISHES PLAN  
A2 1/8" = 1'-0"

no.	description	date
Sheet Revisions		
01	PLAN REV & BID	08.05.2022
Project Issues		

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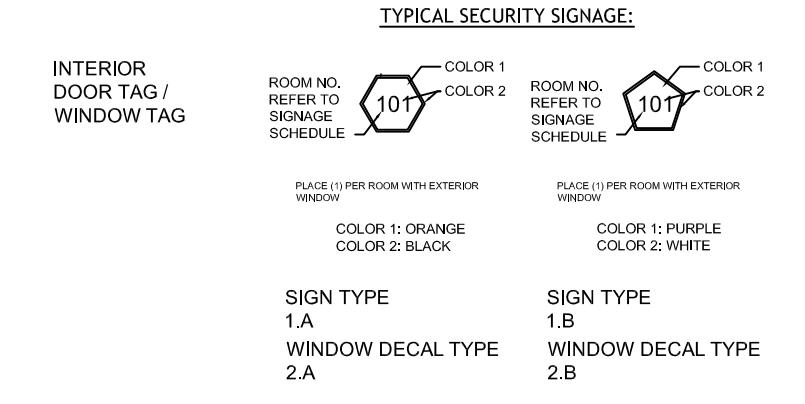
OWNER: FINISH & FURNITURE PLANS

drawn by: ERS  
checked by: JH  
sheet number: A2  
job number: 22019

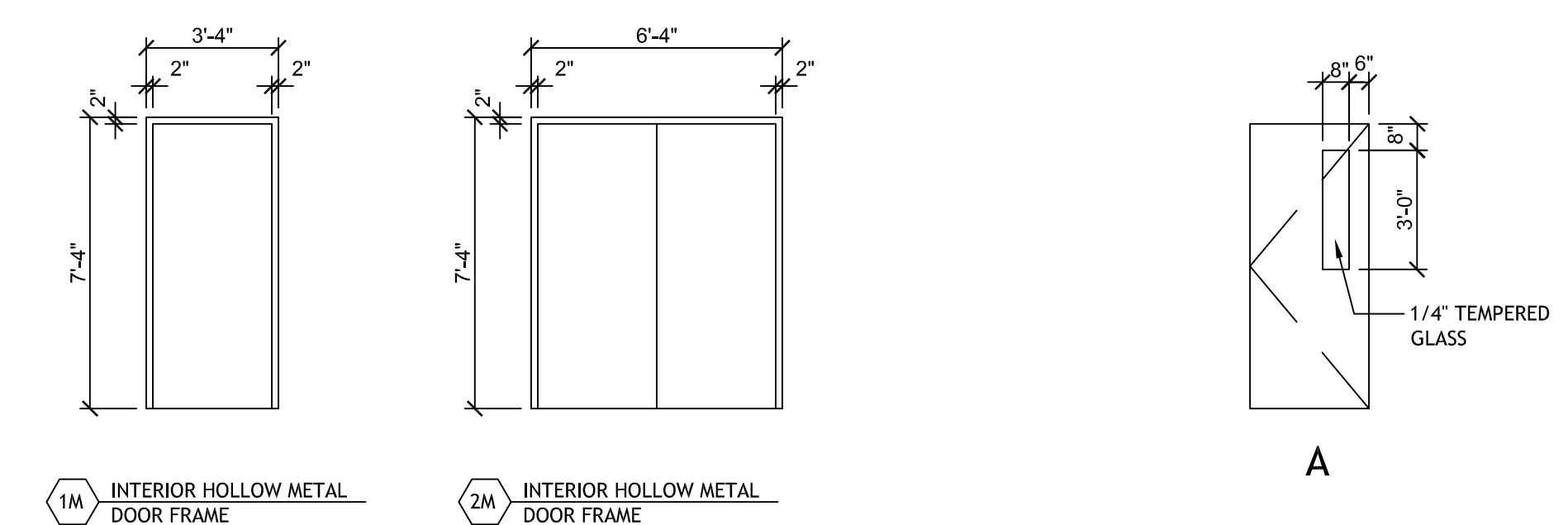
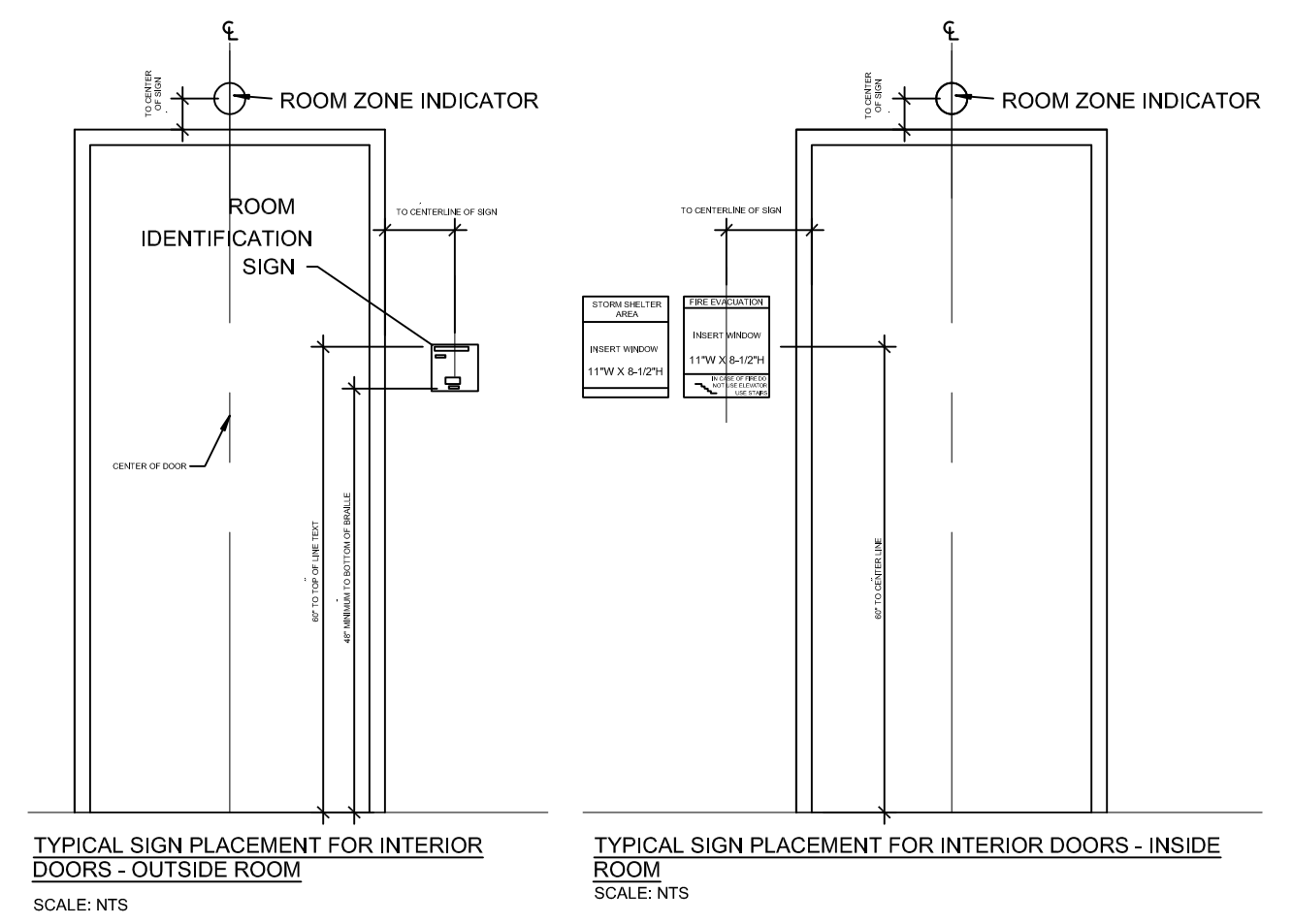
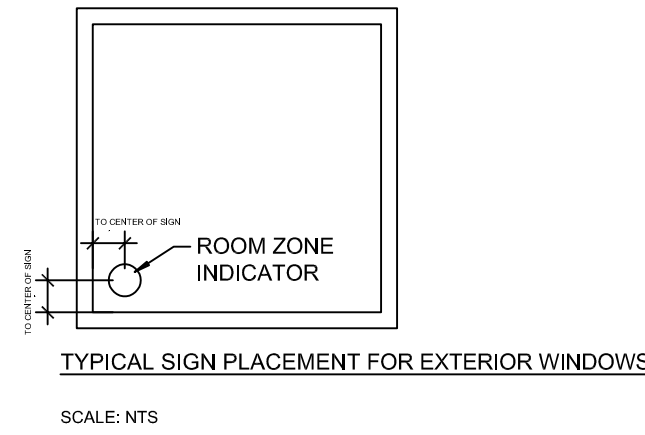


**NOTE:**  
1. ALL SIGNS TO BE MOUNTED AT 60" A.F.F. TO CENTER OF SIGN AND 2" FROM EDGE OF SIGN TO EDGE OF DOOR FRAMES ON LATCH SIDE OF DOOR IF APPLICABLE.  
2. PROVIDE & INSTALL (1) EACH TYPE "N" AND TYPE "P" SIGN NEAR THE ENTRANCE OF EVERY ASSEMBLY AND STUDENT OCCUPIED SPACE. INSERTS SHALL BE PROVIDED BY OWNER.

▬ TYP. BRAILLE

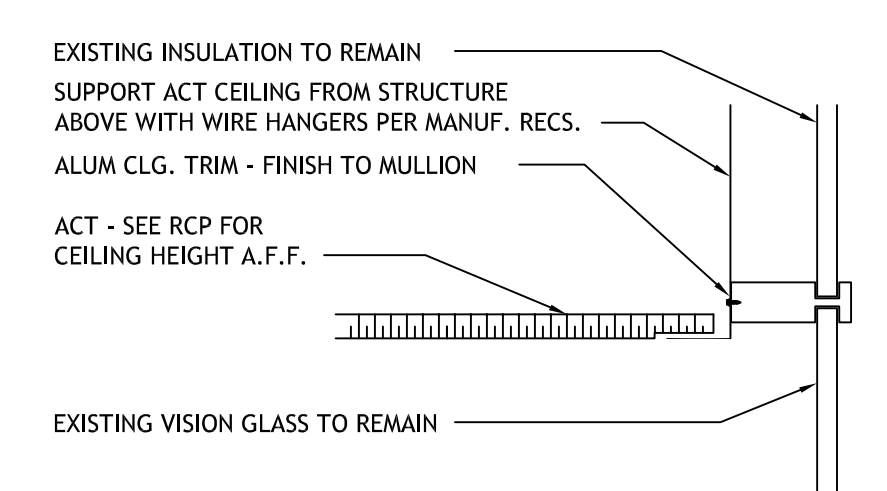


**4 SIGN TYPES**  
A3 SCALE: 1" = 1'-0"



**2 FRAME TYPES**  
A3 SCALE: 1/4" = 1'-0"

**1 DOOR TYPES**  
A3 SCALE: 1/4" = 1'-0"



**3 CEILING DETAIL**  
A3 SCALE: 1" = 1'-0"

**GENERAL DOOR NOTES**

**NOTES**  
1. ALL DOORS ARE 1 3/4" THICK UNLESS OTHERWISE NOTED.  
3. WHERE RATED DOORS ARE INDICATED, DOOR FRAME RATING TO EQUAL DOOR RATING.  
4. UL LABELS: B LABEL = 90 MIN., 60MIN.  
C LABEL = 45 MIN., 20MIN.  
5. PLEASE REFER TO SHEET A3 FOR FRAME AND SIGNAGE TYPES.

**HARDWARE**  
1. SEE 087100 SPECIFICATION FOR DOOR HARDWARE REQUIREMENTS. EACH DOOR SHALL HAVE THE FOLLOWING MINIMUM HARDWARE: (3) HINGES, LEVER SET OR PANIC HARDWARE, CYLINDER LOCKS AND KEYING PER CMSD STANDARDS, STRIKES, CLOSER (WHERE NOTED), DOOR STOP APPROPRIATE FOR LOCATION, COAT HOOK FOR OFFICES, DOOR SILENCERS. ALL DOORS TO HAVE MORITSE LOCKSETS (UNO). EXISTING DOORS TO REMAIN WITH KNOB LOCKSETS SHALL BE CHANGED TO ADA COMPLIANT LEVER HANDLE LOCKSETS.

**ABBREVIATIONS**  
AL/GL - ALUMINUM/GLASS  
HM - HOLLOW METAL  
S - STEEL - STAINLESS STEEL  
FRP - FIBRE REINFORCED PLASTIC  
SCW - SOLID CORE WOOD

**DOOR PLACEMENT**

**TYPICAL DOOR PLACEMENT**  
SCALE: NTS

**DOOR & SIGNAGE SCHEDULE**

DOOR #	SPACE	ROOM NAME	DOOR		FRAME			SIGNAGE TYPE (SEE SPECS)	SECURITY SIGNAGE	REMARKS			
			WIDTH	HEIGHT	TYPE	MAT.	TYPE				H	J	S
001	CLASSROOM		3'-0"	7'-0"	A	SCW	1M	HI	J1	-	A,N,P	1,A	CLASSROOM FUNCTION
002	CLASSROOM		3'-0"	7'-0"	A	SCW	1M	HI	J1	-	A,N,P	1,A	CLASSROOM FUNCTION
003	OFFICE		3'-0"	7'-0"	A	SCW	1M	HI	J1	-	B	1,A	OFFICE FUNCTION
004	COMMONS		3'-0"	7'-0"	A	SCW	1M	HI	J1	-	A,N,P	1,A	EGRESS DOOR, PROVIDE PANIC HARDWARE & DOOR CLOSER.
005	CLASSROOM		3'-0"	7'-0"	A	SCW	1M	HI	J1	-	A,N,P	1,A	CLASSROOM FUNCTION
006	EXISTING OFFICE										B	1,A	OFFICE FUNCTION, CHANGE HARDWARE TO ADA LEVER.
007	EXISTING OFFICE										B	1,A	OFFICE FUNCTION, CHANGE HARDWARE TO ADA LEVER.

**NOTE:** NEW DOORS TO MATCH EXISTING WOOD FINISH.

no.	description	date
Sheet Revisions		

no.	description	date
Project Issues		







Section 200500 - General Requirements

A. General

- 1. Specifications are applicable to all contractors and/or subcontractors for all mechanical systems in Divisions 01, 20, 21, 22, and 23.
2. This contractor is also referred to the architectural, structural, electrical and all other drawings and specifications pertain to this project and fully coordinate with all other trades, owner and architect...
3. Conform to all Instructions to Bidders, general and special conditions of contract as specified by architect and/or owner.
4. Refer to "Alternate Proposals" for possible changes affecting the extent of this section of work.
5. Before submitting a bid, each contractor is requested to visit the job site to familiarize themselves with construction condition, check facilities and conditions and make all necessary observations and measurements.
6. Systems are to be complete and workable in all respects, placed in operation and properly adjusted.
7. Each contractor shall provide for his own clean-up, removal and legal disposal of all rubbish daily.
8. Each contractor shall protect his work, his existing and adjacent property against weather.
9. Each contractor shall protect his work, materials, apparatus and fixtures from damage. Any work damaged by failure to provide protection required, shall be removed and replaced with new material at the contractor's expense.
10. Each contractor must confirm all utility company requirements and connection points in field, prior to starting work.
11. Each contractor must confirm size, location and materials at point of tie in connections in the field prior to rough-in of new work.
12. Arrange for and obtain owner's and insurance representative's permission for any service shutdowns.
13. Each contractor shall be solely responsible for construction means, methods, sequences of construction and the safety of workmen.
14. No piping, ductwork, wiring, etc., shall be installed or routed above or below electrical panels and equipment, through elevator equipment rooms or elevator shafts or stairways unless these items serve these areas only.
15. All contractors shall coordinate with the electrical contractor and obtain a written approval identifying the electrical characteristics of all mechanical equipment prior to ordering of equipment.
16. Each contractor shall include modifying existing conditions to complete the project.
17. Work related to the existing building shall be coordinated to minimize interference or interruption of normal building use by the owner.
18. Ceiling grid systems shall not be supported from ductwork, heating or plumbing lines or any other utility lines, and vice versa.
19. Work included under this division shall consist of furnishing all materials, supplies, equipment, tools, transportation and facilities and performing all labor and services necessary for the complete installation of the mechanical systems of plumbing, fire protection, heating, ventilating, air conditioning, and specialty systems.
20. The contractor under this division shall report discrepancies in the work of others which affect his work.
21. The contractor under this division shall be responsible for proper size and location of anchors, chases, recesses, opening, etc., required for the proper installation of his work.

C. Codes, Permits, Standards and Regulations

- 1. Contractors shall install work in full accordance with rules and regulations of all applicable codes (local, city, county, state, national codes, NFPA, OSHA, etc.), government regulations, utility company requirements, and applicable standards having jurisdiction over premises.
2. Contractors shall secure and pay for all fees, permits, and certificates of inspection incidental to this work required by foregoing authorities.
3. Contractor shall be responsible for payments to all public utilities for work performed by them in connection with provision of service connections required under this division of specifications.
4. Deliver all permits and certificates to architect in duplicate.

D. Design Drawings

- 1. The design drawings, as submitted, are diagrammatic and are not intended to show exact location of equipment, piping and ductwork unless dimensions are given.
2. Before entering into a contract, the successful bidder may be required to submit satisfactory evidence to show that the manufacturer of all parts of the equipment offered have been properly engaged in the manufacture of such equipment for three (3) years and have not had more than three (3) installers of a similar type which have been in successful operation under conditions similar to those specified for not less than two (2) years.
3. All equipment, piping and material specified herein after as shown on the drawings shall be furnished and installed by the contractor, unless specifically indicated to the contrary.
4. If this contractor proposes to install equipment requiring space conditions other than those as specified and/or shown on the design drawings, he shall submit drawings for the rearrangement of the space and shall obtain the full approval of the architect prior to start of any work.
5. The exact locations for fixtures, equipment and piping which is not covered by drawings shall be obtained from the architect in the field representative of his request.
6. Drawings and specifications are intended to supplement one another. Any materials or labor called for in one but not the other shall be furnished as if both were mentioned in the specifications and shown on the drawings.

E. Base Bid Equipment, Materials and Substitutions

- 1. All equipment and materials shall be new, free of defects and UL labeled.
2. Base bid manufacturers are included in the specification or listed in schedules on the drawings.
3. The name or make of any article, device, material, form of construction, fixture, etc., stated in this specification, whether or not the words "or approved equal" are used, shall be known as a "standard".
4. All cost shall be based on "standards" specified.
5. The equipment schedules on the drawings indicate manufacturer and their equipment model numbers that this design has been based on.
6. Where more than one make or name is mentioned as being acceptable, it shall be understood that only the name or make referring to the manufacturer's model numbers or sizes shall be considered the "Specified Standards".
7. Bids concerning the use of substitute products must be accompanied by complete specifications and performance characteristic covering these products.
8. Contractor is also invited to bid on any other similar products the contractor desires to propose as substitutions, stating any difference in cost (add or deduct from base bid cost) for each proposed substitution.
9. Substitutions are subject to the approval of the owner. If a substitution is submitted, it is the contractor's responsibility to evaluate it and certify that the substitution is equivalent in all respects to the base specifications.
10. If substitutions are approved, notify all other contractors, subcontractors, etc., affected by the substitution and fully coordinate with them.
11. All equipment shall be installed in full accordance with the manufacturer's data and installation instructions and service clearances. It is the contractor's responsibility to check and confirm these requirements prior to starting of any work.

F. Warranty

- 1. Fully warrant all materials, equipment and workmanship and the successful operation of all equipment and apparatus installed by this contractor for one (1) year from date of final acceptance.
2. Extend all manufacturers' warranties to owner, including five (5) year compressor and ten (10) year heat exchanger extended warranty on HVAC equipment to be installed under this contract.
3. Repair or replace without material and labor charge to the owner all items found defective during the warranty periods.
4. Submittals will be reviewed only for general compliance with the contract documents and not for dimensions or quantities.
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G. Shop Drawing Submittals

- 1. Submit shop drawings for mechanical, plumbing, fire protection, and control systems, including but not limited to sheetmetal, plumbing fixtures and equipment with adequate details and scales to clearly show construction.
2. Sheetmetal and fire protection shop drawings shall be fully dimensioned and coordinated based on field verified building dimensions and clearances and architectural ceiling layouts.
3. Contractor shall review and indicate his approval of each drawing prior to submittal for review.
4. Submittals will be reviewed only for general compliance with the contract documents and not for dimensions or quantities.

Section 200510 - Basic Materials and Methods

A. General

- 1. Provide all materials, labor, equipment, and accessories required to furnish and install the mechanical items identified in this section.
2. Refer to architectural drawings and specifications for methods to complement other division sections in this specification and requirements indicated on the mechanical drawings.
3. Report any interferences between work under this division and that of any other contractor to architect as soon as they are discovered.
4. The contractor shall be responsible for safeguarding work, property, and facilities against damage, both his own as well as others with which he may come into contact.
5. Stored materials shall be protected against damage from weather.
6. During construction, all return air ductwork and transfer air openings serving new and existing air handling equipment and/or adjacent tenant spaces shall be protected.
7. Hangers and supports are to be provided to properly support, secure and align piping and to meet field conditions and as manufactured by Grinnell, Michigan Hanger or Caddy.
8. Hangers, brackets, clamps, etc., shall be of standard weight steel.
9. Each contractor shall be responsible for providing all required access panels necessary for his work.
10. Each contractor shall also provide access panels for any existing conditions as required.
11. All insulation shall be installed over clean, dry surfaces.
12. All ductwork shall be insulated with 2" thick, 1.5 pcf, minimum R-6, foil faced reinforced kraft jacket fiberglass duct wrap fully secured to duct.
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B. Supervision

- 1. The contractor shall have in charge of work at all times during construction a competent foreman or superintendent whose experience and background shall qualify him for the work to be performed under this division.
2. The contractor shall submit a list of materials to the architect.
3. The contractor shall be responsible for safeguarding work, property, and facilities against damage, both his own as well as others with which he may come into contact.
4. Stored materials shall be protected against damage from weather.
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C. Protection of Work and Property

- 1. The contractor shall be responsible for safeguarding work, property, and facilities against damage, both his own as well as others with which he may come into contact.
2. Stored materials shall be protected against damage from weather.
3. During construction, all return air ductwork and transfer air openings serving new and existing air handling equipment and/or adjacent tenant spaces shall be protected.
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D. Supports and Hangers

- 1. Hangers and supports are to be provided to properly support, secure and align piping and to meet field conditions and as manufactured by Grinnell, Michigan Hanger or Caddy.
2. Hangers, brackets, clamps, etc., shall be of standard weight steel.
3. Each contractor shall be responsible for providing all required access panels necessary for his work.
4. Each contractor shall also provide access panels for any existing conditions as required.
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E. Access Panels

- 1. Each contractor shall be responsible for providing all required access panels necessary for his work.
2. Each contractor shall also provide access panels for any existing conditions as required.
3. Contractor shall mark lay-in ceiling tiles, in a method approved by the architect, where access is required to such mechanical, plumbing, and fire protection equipment, valves, regulators, mixing boxes, fire damper, etc.
4. Noise and Vibration Isolation
1. Vibration or noise created in any part of the building by the operation of any equipment furnished and/or installed under this contract will be prohibited, and this contractor shall take all precautions by isolating the various items of equipment, pipe and sheet metal work from the building structure.
2. Piping and ductwork shall be supported independently of the mechanical equipment and shall be isolated as follows:
a. All equipment shall be supported on resilient conditions shall be used between air handling equipment and ductwork.
b. All ductwork within the mechanical equipment and air handling rooms shall be suspended with rod and rubber-shear hangers.
c. Isolation efficiency shall be based on the lowest operating speed of the supported equipment.
5. Miscellaneous Steel
1. Furnish and install all miscellaneous steel required for supports, hangers, anchors, guides, etc., and required for installation of equipment and materials furnished and installed under this division.

F. Noise and Vibration Isolation

- 1. Vibration or noise created in any part of the building by the operation of any equipment furnished and/or installed under this contract will be prohibited, and this contractor shall take all precautions by isolating the various items of equipment, pipe and sheet metal work from the building structure.
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G. Miscellaneous Steel

- 1. Furnish and install all miscellaneous steel required for supports, hangers, anchors, guides, etc., and required for installation of equipment and materials furnished and installed under this division.

H. Painting

- 1. This contractor shall perform all painting incidental to this work.
2. All insulation shall be painted at the time of installation with one coat of Benjamin Foster "Lagone" water base paint.
3. All uncovered exposed sheet metal shall be thoroughly cleaned and neutralized and given two (2) coats of alkyd resin paint of a color to match existing building structure or as selected by the architect.
4. All painting shall be done with a brush or roller.
5. All finishing materials, thinners, etc., shall be the best quality, first line materials as manufactured by:
a. E.I. Dupont De Nemours and Company
b. Pratt and Lambert, Inc.
c. The Glidden Company
d. The Sherwin-Williams Company
e. The Pittsburgh Plate Glass Company
6. All paint materials shall be delivered to the job in the manufacturer's original unopened and labeled containers, and they shall be used strictly in accordance with the manufacturer's directions.
7. This contractor shall submit a list of materials to the architect.
8. The architect's approval must be secured before any painting work is started.

I. Clean-Up

- 1. Insofar as this contract is concerned, at all times keep premises and building in a neat and orderly condition.
2. Upon completion of work, this contractor shall thoroughly clean all apparatus furnished by him, pack all valves and thoroughly clean piping, fixtures and equipment removing all dirt, grease and oil.
3. Air systems shall not be operated without filters.
4. Design Basis
1. Design basis for system shall be per NFPA 13 (latest edition) building code requirements, local water department, local fire department, state fire marshal, local code, and owner and owner's fire insurance underwriter requirements.
5. Drawings and Calculations
1. Contractor shall prepare submittal drawings and hydraulic calculations with a 10% factor of safety for building in accordance with owner's insurance company building department, and local fire authority requirements, tenant's requirements for design density, whichever is most stringent.
6. Contractor shall perform a flow test data on water main and submit data with calculations.
7. Fire protection contractor's responsibility to verify each tenant's design density with agreed upon lease documentation and that tenant's prototype or insurance underwriters requirements.
8. Provide wet standpipe system for project in accordance with NFPA 14 requirements.
9. Contractor and designer shall be state certified.
10. Coordinate layout and installation of sprinklers with ductwork and equipment above ceilings and other construction that penetrates ceilings, including but not limited to light fixtures, speakers, HVAC equipment, doors and partition assemblies.
11. Examine areas and conditions under which fire protection materials and products used to be installed.
12. Show drawings review does not relieve fire protection contractor from responsibility to meet each tenant's requirements for sprinkler coverage.
13. Fire protection contractor is responsible for verifying any high pile storage requirements of future tenants and providing an incoming sprinkler service size and risers to meet the requirements for adequate sprinkler coverage.

Section 200530 - Testing, Adjusting and Balancing

A. General

- 1. After installation, check all equipment and perform start up in accordance with the manufacturer's instructions.
2. All piping shall be tested and free of leaks as required by the local authority having jurisdiction.
3. Work that is scheduled to be concealed or insulated shall remain uncovered until required tests have been completed.
4. Balance all systems, calibrate controls, check for proper operation and sequence under all conditions and make all necessary adjustments.
5. Instruct owner in operation of systems and submit operating and maintenance manual for all equipment and systems.
6. Submit air balance report from independent AABC or NEBB certified subcontractor for all air and water systems per AABC or NEBB standards.
7. Submit duct leakage test report from independent AABC or NEBB certified contractor.
8. When the contractor is ready to run capacity tests, he shall notify the architect.
9. Work under this division of the specifications shall not be considered complete until the contractor has obtained required inspection, performance tests, made necessary adjustments and has submitted satisfactory evidence of the architect or his representative will make spot checks to determine the accuracy and completeness of final adjustments.
10. During one complete heating and one complete cooling season, the contractor shall make any minor adjustments that may be necessary to ensure uniform temperatures throughout the spaces.
11. Test results shall be submitted to the architect/engineer.
12. The Test and Balancing contractor shall adjust all shaves or provide new shaves and belts as required in order to properly balance the air handling equipment.
13. After equipment is placed in operation, systems shall be balanced to within 10% of design flow with report submitted to owner.
14. Balance the air systems prior to balancing hydronic, steam, and refrigerant systems.
15. Test, adjust and balance cooling systems during summer season and heating systems during winter season.
16. Start up and place all systems in operation and tag all switches and controls with permanent labels.
17. Train and instruct owner on proper operation and preventative maintenance of system.
18. Air Handling Equipment: For each piece of air handling equipment, this contractor shall list the data of the fan, motor and drive and shall obtain by measurement and furnish to the architect/engineer the fan speed, motor voltage, operating amps, for cfm and static pressure as determined from the manufacturer's fan curves.
19. Diffusers, Registers, Grilles: After completion of the air distribution systems and final adjustments, the contractor shall adjust all dampers and air supply, return and exhaust outlets so that each outlet handles its proper quantity of air.
20. For fire protection contractor's responsibility to verify each tenant's design density with agreed upon lease documentation and that tenant's prototype or insurance underwriters requirements.
21. Provide wet standpipe system for project in accordance with NFPA 14 requirements.
22. Contractor and designer shall be state certified.
23. Coordinate layout and installation of sprinklers with ductwork and equipment above ceilings and other construction that penetrates ceilings, including but not limited to light fixtures, speakers, HVAC equipment, doors and partition assemblies.
24. Examine areas and conditions under which fire protection materials and products used to be installed.
25. Show drawings review does not relieve fire protection contractor from responsibility to meet each tenant's requirements for sprinkler coverage.
26. Fire protection contractor is responsible for verifying any high pile storage requirements of future tenants and providing an incoming sprinkler service size and risers to meet the requirements for adequate sprinkler coverage.

Section 200700 - Insulation

A. General

- 1. Furnish all material, labor and equipment as required to install complete plumbing and HVAC insulation as indicated on mechanical drawings and in these specifications.
2. Install in full accordance with manufacturer's recommendations.
3. Scope: This contractor shall furnish and install all insulation necessary to the project and in accordance with the following requirements.
4. All insulation shall be installed over clean, dry surfaces.
5. Wet or damaged insulation will not be acceptable.
6. All ductwork shall be insulated with 2" thick, 1.5 pcf, minimum R-6, foil faced reinforced kraft jacket fiberglass duct wrap fully secured to duct.
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Section 211000 - Fire Protection Systems

A. General

- 1. Furnish all labor, materials and equipment as required to install a complete fire protection system for project.
2. Field-verify sizes and location of existing sprinkler piping before fabrication of new.
3. This contractor shall be responsible for the removal and reinstallation of existing ceiling tiles, as required, for the installation of work shown in areas existing ceilings are to remain.
4. This removal and reinstallation of existing lay-in ceiling tiles shall be the responsibility of the fire protection contractor (under the supervision of the general contractor) as required to perform his work.
5. This contractor shall modify and relocate sprinkler piping and provide new sprinkler piping and heads, as required, to accommodate new mechanical work in full compliance with NFPA 13.
6. Design Basis
1. Design basis for system shall be per NFPA 13 (latest edition) building code requirements, local water department, local fire department, state fire marshal, local code, and owner and owner's fire insurance underwriter requirements.
7. Drawings and Calculations
1. Contractor shall prepare submittal drawings and hydraulic calculations with a 10% factor of safety for building in accordance with owner's insurance company building department, and local fire authority requirements, tenant's requirements for design density, whichever is most stringent.
2. Contractor shall perform a flow test data on water main and submit data with calculations.
3. Fire protection contractor's responsibility to verify each tenant's design density with agreed upon lease documentation and that tenant's prototype or insurance underwriters requirements.
4. Provide wet standpipe system for project in accordance with NFPA 14 requirements.
5. Contractor and designer shall be state certified.
6. Coordinate layout and installation of sprinklers with ductwork and equipment above ceilings and other construction that penetrates ceilings, including but not limited to light fixtures, speakers, HVAC equipment, doors and partition assemblies.
7. Examine areas and conditions under which fire protection materials and products used to be installed.
8. Show drawings review does not relieve fire protection contractor from responsibility to meet each tenant's requirements for sprinkler coverage.
9. Fire protection contractor is responsible for verifying any high pile storage requirements of future tenants and providing an incoming sprinkler service size and risers to meet the requirements for adequate sprinkler coverage.

D. Piping

- 1. All piping shall be installed in accordance with NFPA 13, 14 (latest edition) and local code requirements.
2. Fire protection piping shall be as follows:
a. Below-grade outside building - ductile iron, cement lined. Class of pipe as directed by local water purveyor with mechanical or push-on type joints.
b. Inside building - pipe and tubing shall be steel or copper in accordance with NFPA requirements.
c. Piping shall match existing building standards.
d. Contractor shall arrange with owner and insurance underwriter prior to shut down of existing systems.
e. Flush all piping upon completion of project and test per NFPA requirements.
f. No piping shall be installed at locations subject to freezing.
3. Excavation and backfill - see Section 200510, Basic Materials and Methods.

E. Sprinkler Heads

- 1. Sprinkler heads shall be UL listed, match existing building standards and be manufactured by Central, Bear or Viking.
2. Sprinkler heads shall be as follows:
a. Areas with exposed structure
1) Upright - rough brass.
b. Areas with ceilings
1) Recessed Pendant - chrome plated with matching two (2) piece, flush escutcheon.
2) Concealed - brass finish with off-white ceiling cover plate.
3) Sidewall - chrome plated with off-white, two (2) piece, semi-recessed escutcheon.
3. Install concealed heads with white flush mounted cover plates in (balis atss)
4. Install higher temperature sprinkler heads where required by code or application.
5. Sprinkler heads shall be located in the center of ceiling tiles or the center of an area of a 24" x 24" tile section. See architectural reflected ceiling plans.
6. Submit samples of sprinkler heads to architect prior to fabrication of any piping.
7. Install inspector's test connection with valve and terminate drain through exterior wall with text fitting and splash block.

F. Valves

- 1. Install all valves as required by NFPA 13, UL or FM listed and as manufactured by Grinnell, Hammond or Milwaukee.
2. All shut-off valves shall be fitted with tamper switches by fire protection contractor and wired by electrical contractor.









**GENERAL NOTES:**

- THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND PROPER INSTALLATION OF ALL FIRE PROTECTION SYSTEMS.
- THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS SUPPORTING STEEL ETC. FOR THE PROPER INSTALLATION OF ALL FIRE PROTECTION SYSTEMS.
- THE CONTRACTOR SHALL COORDINATE FLOOR, WALL AND ROOF PENETRATIONS WITH THE GENERAL TRADES CONTRACTOR.
- PIPING SHALL NOT BE LOCATED OVER THE TOP OF ANY ELECTRICAL PANELS OR EQUIPMENT.
- THE CONTRACTOR SHALL COORDINATE THE LOCATION OF SPRINKLER HEADS WITH THE ARCHITECTURAL REFLECTED CEILING PLANS. ALL SPRINKLER HEADS ARE TO BE LOCATED IN THE CENTER OF CEILING TILES IN LAY-IN AREAS UNLESS OTHERWISE INDICATED.
- PROVIDE GUARDS FOR SPRINKLERS IN STORAGE OR HAZARDOUS AREAS.
- SPRINKLER HEADS ARE SHOWN FOR COORDINATION ONLY. A REGISTERED SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL DESIGN AND INSTALLATION OF COMPLETE SPRINKLER SYSTEM ALL IN ACCORDANCE WITH NFPA-13 AND LOCAL FIRE PREVENTION AUTHORITY. REFER TO ARCHITECTURAL CEILING DEVICE PLAN TO LOCATE SPRINKLER HEADS.
- FIRE PROTECTION CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL OBSTRUCTIONS INCLUDING: PIPING, STRUCTURAL STEEL, CONDUIT, DUCTWORK, EQUIPMENT AND MISCELLANEOUS ITEMS BEFORE INSTALLATION OF SPRINKLER SYSTEM TO AVOID INTERFERENCES.
- FABRICATION, ERECTION AND TESTING OF ALL PIPING SYSTEMS SHALL BE IN ACCORDANCE WITH OWNERS GENERAL REQUIREMENTS, N.F.P.A. 13 & 24 AND LOCAL CODE & AUTHORITIES.
- FIRE PROTECTION CONTRACTOR SHALL MAKE ALL DRAWINGS, SUBMITTALS, TEST CERTIFICATE SUBMITTALS AND PAY ALL REQUIRED FEES TO THE OWNERS INSURING AGENT AND LOCAL AUTHORITIES FOR REQUIRED PERMITS.
- FIRE SPRINKLER SYSTEM TO PROVIDE COVERAGE BELOW CEILING IN ALL AREAS PER THE STATE AND LOCAL FIRE MARSHALL.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS AND CALCULATIONS FOR BUILDING DEPARTMENT APPROVAL PRIOR TO INSTALLATION OF SPRINKLER SYSTEM. FIRE SPRINKLER SYSTEM TO MEET REQUIREMENTS OF OWNER, NFPA 13, THE STATE AND LOCAL FIRE MARSHALL OR WHICHEVER IS MORE STRINGENT.
- FIRE PROTECTION PLANS (SPRINKLER DRAWINGS) MUST BE ENGINEERED AND WET SEALED BY A LICENSED REGISTERED FIRE PROTECTION CONTRACTOR IN THE LOCAL JURISDICTION.
- ALL PIPE FITTINGS, VALVES, HANGER MATERIAL, ALARM DEVICES, AND SPRINKLER DEVICES SHALL BE INSTALLED PER NFPA 13 AND LOCAL CODE REQUIREMENTS.
- TESTING OF THE SPRINKLER SYSTEM SHALL CONFORM WITH NFPA 13 REQUIREMENTS.
- ALL PIPE 2" AND SMALLER SHALL BE SCHEDULE 40 WITH SCREWED CAST IRON FITTINGS.
- ALL PIPE 2-1/2" AND LARGER SHALL BE SCHEDULE 10 WITH GROOVED FITTINGS AND GROOVED RIB COUPLINGS.
- ALARMS SHALL BE INSTALLED PER LOCAL CODE REQUIREMENTS.
- FIRE CALK ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES.

THIS DRAWING IS FOR REFERENCE ONLY. FIRE PROTECTION CONTRACTOR FOR THIS PROJECT SHALL PROVIDE FULLY DETAILED SPRINKLER PLANS AND CALCULATIONS.

APPROVAL IS CONTINGENT UPON LOCAL FIRE MARSHAL AND OWNER'S INSURANCE UNDERWRITER'S APPROVAL.

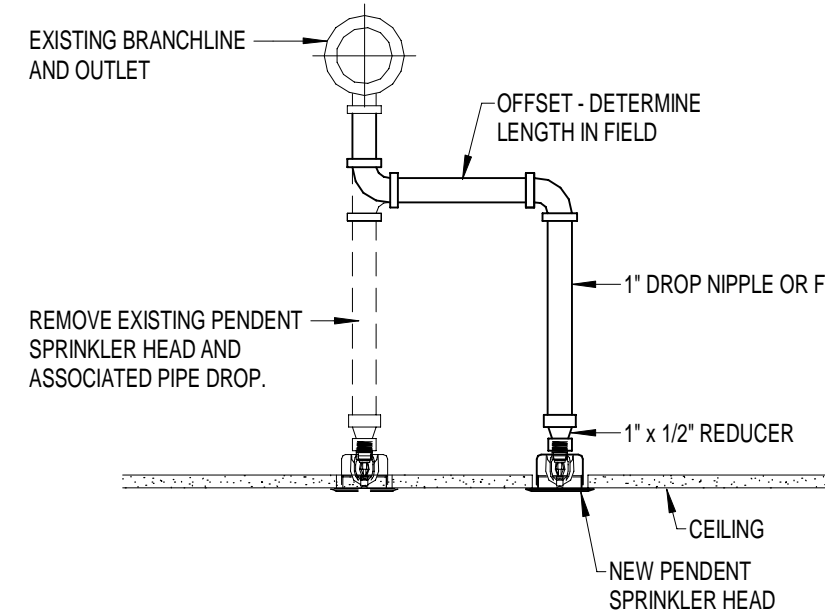
FIRE SPRINKLER CONTRACTOR TO VERIFY FLOW TEST INFORMATION IS CURRENT AND WATER PRESSURE ON SITE IS ADEQUATE TO MEET THE DEMAND OF THE FIRE SPRINKLER SYSTEM. IF PRESSURE IS NOT ADEQUATE, FIRE SPRINKLER CONTRACTOR SHALL PROVIDE AN ALTERNATE TO ADD A FIRE PUMP IN THE BIDDING PHASE AND NOTIFY THE ENGINEER ON RECORD IMMEDIATELY.

**FIRE PROTECTION LEGEND**

- SPR — WET SPRINKLER PIPING
- FUGJ — UNDERGROUND FIRELINE PIPING
- — — — — PIPING/EQUIPMENT TO BE REMOVED
- SPR (E) — EXISTING SPRINKLER PIPING TO REMAIN
- TS — SHUT-OFF VALVE WITH TAMPER SWITCH
- FS — SPRINKLER FLOW SWITCH
- — — — — CHECK VALVE
- — — — — FIRE HYDRANT
- — — — — FIRE DEPARTMENT HOSE VALVE
- — — — — FIRE PUMP TEST HEADER
- — — — — POST TYPE FIRE DEPARTMENT CONNECTION
- — — — — FIRE DEPARTMENT CONNECTION
- AFF — ABOVE FINISHED FLOOR
- CTX — CONNECT TO EXISTING ELECTRICAL CONTRACTOR EXISTING TO REMAIN
- ETR — FIRE HYDRANT
- FPC — FIRE PROTECTION CONTRACTOR
- FP — FIRE PUMP
- GC — GENERAL CONTRACTOR
- JP — JOCKEY PUMP
- PC — PLUMBING CONTRACTOR
- PV — POST INDICATOR VALVE
- TS — TAMPER SWITCH
- WV — WALL INDICATOR VALVE

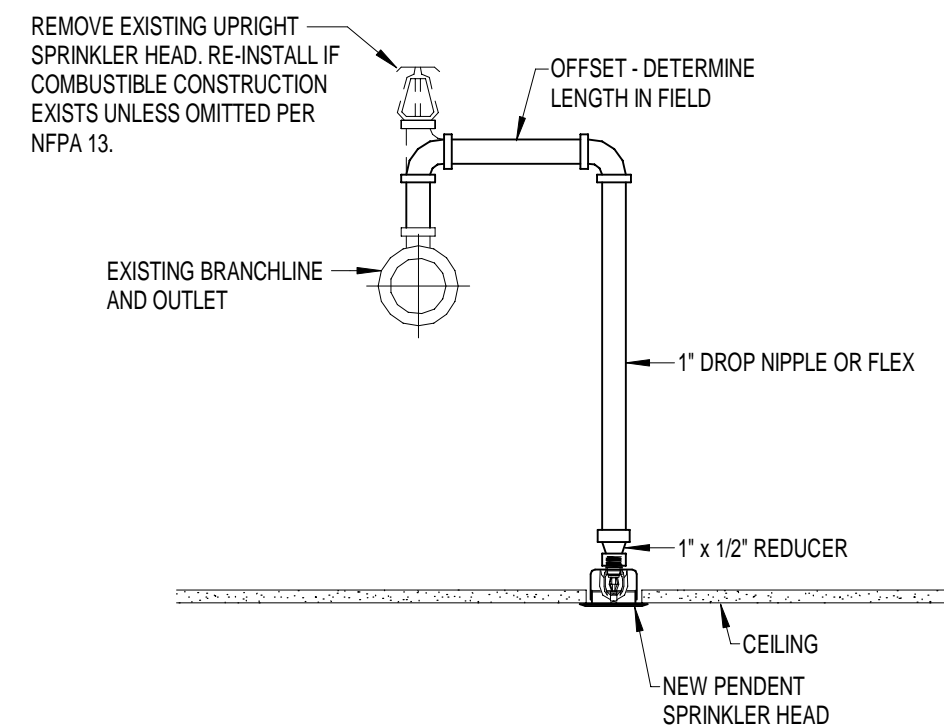
**FIRE SPRINKLER - HATCH LEGEND**

- ORDINARY HAZARD OCCUPANCY.
- UNHATCHED AREAS ARE CONSIDERED LIGHT HAZARD OCCUPANCY.
- AREA PROTECTED BY DRY SPRINKLER SYSTEM.



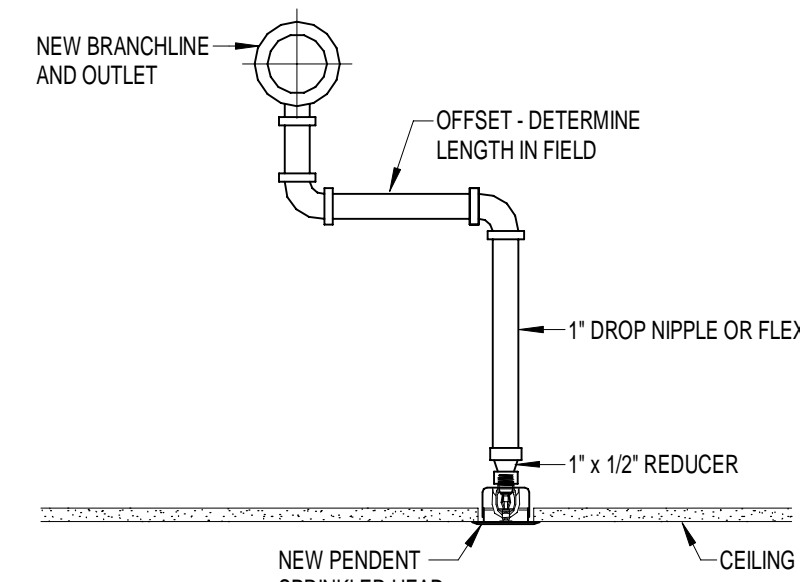
**ARMOVER HEAD PIPING DETAIL (EXISTING PENDENT)**

N.T.S.



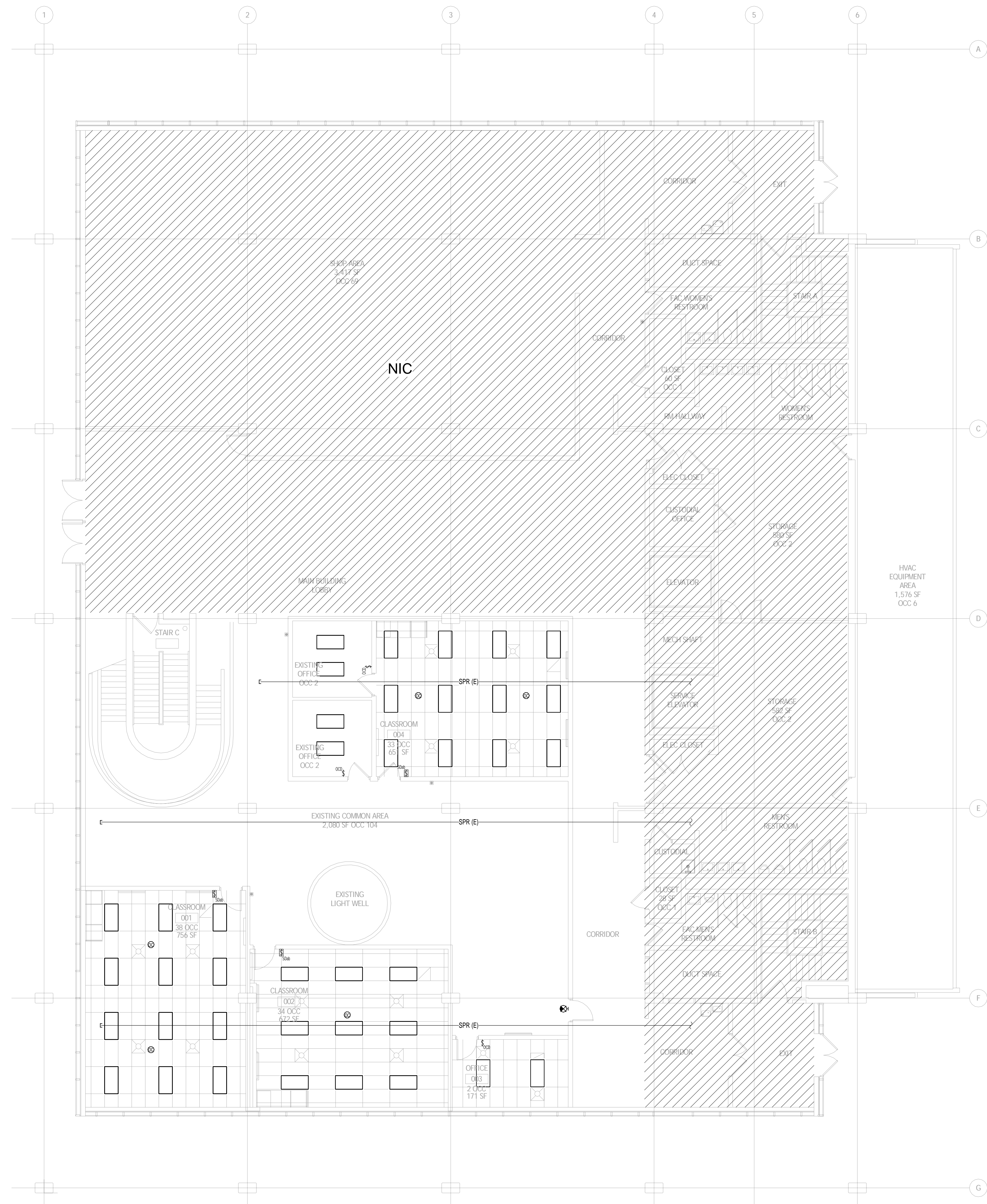
**ARMOVER HEAD PIPING DETAIL (EXISTING UPRIGHT)**

N.T.S.



**ARMOVER HEAD PIPING DETAIL (NEW PENDENT)**

N.T.S.



**FIRE PROTECTION PLAN**  
1/8" = 1'-0"

no.	description	date
Sheet Revisions		

01	PLAN REV & BID	06.05.2022
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no.	description	date
Project Issues		

design and construction documents as instruments of service are prepared by the design professional and the construction documents are prepared by the design professional. the design professional is not responsible for the construction of the project. the design professional is not responsible for the construction of the project. the design professional is not responsible for the construction of the project.

sheet name:  
FIRE PROTECTION PLAN

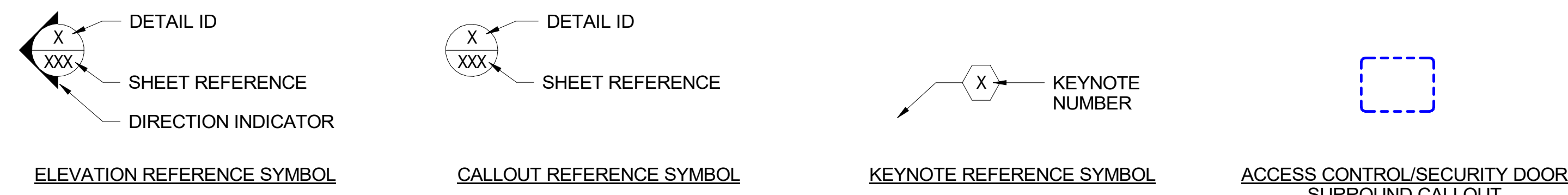
drawn by:	TBA
checked by:	TBA
sheet number:	F1
job number:	22019

**TBA**  
Thorson+Baker + Associates  
CONSULTING ENGINEERS

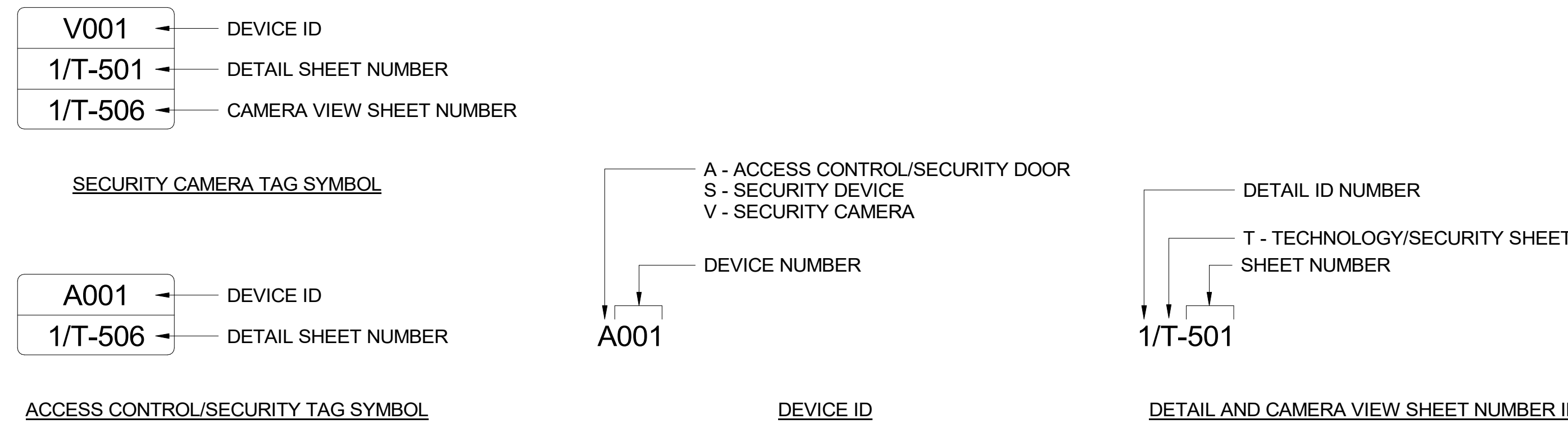
3030 West Shiloh Road  
Rustfield, Ohio 44296

(330) 659-6688 PH.  
(330) 659-6675 FAX

**REFERENCE AND KEYNOTE SYMBOLS**



**SHEET AND TAG SYMBOLS**



**GENERAL SYMBOLS**

SYMBOL	DESCRIPTION
[J]	JUNCTION BOX WALL MOUNTED
[J]	JUNCTION BOX MOUNTED IN CEILING
[J]	JUNCTION BOX MOUNTED IN FLOOR
[PB]	PULLBOX
[PT]	POWER POLE WITH DEVICES INDICATED (P-POWER, T-TELECOM, PT-POWER AND TELECOM)

**CONNECTOR SYMBOLS**

SYMBOL	DESCRIPTION
●	CONDUIT UP
○	CONDUIT DOWN
⌋	BREAK SYMBOL
├	CONDUIT STUB TERMINATE WITH BUSHING
┌	CONDUIT SLEEVE

**TELECOMMUNICATION SYMBOLS**

SYMBOL	SECTION	DESCRIPTION
[W]	270528	WIRE MESH OR SOLID BOTTOM CABLE TRAY SYSTEM (REFER TO PLANS), 12"Wx4"D UNLESS OTHERWISE NOTED, MOUNTING HEIGHT IS TO BOTTOM OF TRAY. HEIGHT VARIES, REFER TO PLANS FOR ADDITIONAL INFORMATION.
[S]	270528	TELECOMMUNICATIONS SLEEVE UNLESS OTHERWISE NOTED, PROVIDE TWO 1" SLEEVES FROM THE CORRIDOR INTO EVERY ROOM. ONE SHALL BE FOR UTP CABLING AND THE OTHER FOR SECURITY, CENTRAL SOUND, AND CATV CABLING.
[DMARC]	271100	DMARC LOCATION FOR ALL TELECOMMUNICATION AND DATA SERVICES.
[W]	271500, 273123	WALLPHONE OUTLET. REFER TO THE FACEPLATE DETAILS FOR ADDITIONAL INFORMATION. PROVIDE A TELEPHONE HANDBOOK. WP/AR - WALL PHONE FOR AREA OF REFUGE, COORDINATE WITH FIRE ALARM CONTRACTOR.
[#]	271500, 273123	DATA OUTLET. "#" SUBSCRIPT INDICATES QUANTITY OF CABLES/JACKS REQUIRED (BLANK IMPLIES ONLY ONE). REFER TO THE FACEPLATE DETAILS FOR ADDITIONAL INFORMATION.
[#]	271500	DATA CEILING OUTLET. "#" SUBSCRIPT INDICATES QUANTITY OF CABLES/JACKS REQUIRED (BLANK IMPLIES ONLY ONE). REFER TO FACEPLATE DETAILS FOR ADDITIONAL INFORMATION.
[#]	271500	DATA FLOOR OUTLET. "#" SUBSCRIPT INDICATES QUANTITY OF CABLES/JACKS REQUIRED (BLANK IMPLIES ONLY ONE). FLOOR BOX OR POKE THROUGH SPECIFIED ON THE POWER PLANS UNLESS OTHERWISE NOTED.
[WAP]	271500, 272133	WIRELESS ACCESS POINT CABLING LOCATION. PROVIDE WITH 15' OF CABLE COILED ABOVE THE ACCESSIBLE CEILING.
[WAP]	271500, 272133	WIRELESS ACCESS POINT WALL MOUNT CABLING LOCATION. PROVIDE WITH 15' OF CABLE COILED ABOVE THE ACCESSIBLE CEILING.
[R]	271100	TELECOM RACK FLOOR MOUNTED WITH 6 INCH VERTICAL CABLE MANAGERS
[E]	271100	TELECOM ENCLOSURE - WALL MOUNTED
[E]	271100	TELECOM EQUIPMENT CABINET - FREE STANDING
[G]	271100	TELECOM MAIN GROUND BUS OR TELECOM GROUND BUS
[C]	271300, 271500	CONSOLIDATION POINT
●	273123	TELEPHONE HANDBOOK ASSOCIATED WITH ADJACENT FACEPLATE (REFER TO TELEPHONE SCHEDULE AND SPECIFICATIONS FOR DETAILS).

**CAMERA MOUNTING SYMBOLS**

SYMBOL	EXAMPLE	DESCRIPTION
[T]	[1F]	CAMERA WALL MOUNT
[Y]	[1F]	CAMERA CORNER MOUNT
[OR]	[1F]	CAMERA POLE MOUNT
[P]	[1F]	CAMERA PARAPET/TELESCOPIC MOUNT
[C]	[1F]	CAMERA CEILING MOUNT (NO MOUNTING SYMBOL)

**SHEET INDEX**

SHEET NUMBER	SHEET NAME
T-001	TECHNOLOGY LEGENDS
T-002	TECHNOLOGY NOTES
T-101	TECHNOLOGY FIRST FLOOR PLAN
T-501	TECHNOLOGY DETAILS (FACE PLATES)
T-502	TECHNOLOGY DETAILS

**AUDIO VISUAL SYMBOLS**

SYMBOL	SECTION	DESCRIPTION
[AV1]	274100	PRESENTATION POINT OUTLET LOCATION. REFER TO THE FACEPLATE DETAILS AND CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION.
[AV2]	274100	DISPLAY OUTLET LOCATION. REFER TO THE FACEPLATE DETAILS AND CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION. -IF P INDICATES OUTLET FOR INTERACTIVE FLAT PANEL, MOUNTED AT 80" AFF. COORDINATE WITH MOUNTING BRACKET AND ARCHITECTURAL.
[AV3]	274100	PRESENTATION POINT OUTLET LOCATION. REFER TO THE FACEPLATE DETAILS AND CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION.
[AV4]	274100	DISPLAY OUTLET LOCATION. REFER TO THE FACEPLATE DETAILS AND CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION. -IF P INDICATES OUTLET FOR INTERACTIVE FLAT PANEL, MOUNTED AT 80" AFF. COORDINATE WITH MOUNTING BRACKET AND ARCHITECTURAL.
[AV#]	274100	AUDIO/VIDEO OUTLET. REFER TO THE KEY NOTES ON FLOOR PLAN SHEET FOR OUTLET INFORMATION.
[SF]	274100	SOUND FIELD AUDIO/VIDEO OUTLET. REFER TO THE FACEPLATE DETAILS AND CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION.
[PROJ]	274100	WALL-MOUNTED ULTRA SHORT THROW PROJECTOR. REFER TO THE CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION.
[PROJ]	274100	CEILING-MOUNTED PROJECTOR. REFER TO THE CONNECTIVITY DETAILS FOR ADDITIONAL INFORMATION.
[S]	274100, 275120, 275127	SINGLE POLE DOUBLE THROW WALL SWITCH
[E]	115213	CEILING MOUNTED ELECTRIC PROJECTION SCREEN.
[E]	115213	WALL MOUNTED ELECTRIC PROJECTION SCREEN.
[IB]	274000	AUDIO VISUAL CAMERA W/BROADCASTING CAPABILITIES.
[X]	274000	DISPLAY MONITOR. "X" INDICATES SIZE OF MONITOR EQUIPPED WITH MOUNTING BRACKET. -IF P INDICATES INTERACTIVE FLAT PANEL. COORDINATE WITH ARCHITECTURAL.
[SS]	275120	SS-SOUND SYSTEM CABINET SUBSCRIPT: (G) GYM; (AG) AUX GYM; (D) DINING; (T) THEATER; (N) NATATORIUM; (M) MUSIC; (I) INSTRUMENTAL; (V) VOCAL ROOM.
[S]	274100, 275120, 275127	WALL MOUNTED SPEAKER. "S" INDICATES SOUND SYSTEM, OTHER SPEAKERS INCLUDE: (PA) PUBLIC ADDRESS; (CS) CLASSROOM SOUND FIELD. SUBSCRIPT "V" INDICATES THAT THE SPEAKER IS VOLUME CONTROLLED.
[S]	274100, 275120, 275127	CEILING MOUNTED SPEAKER. "S" INDICATES SOUND SYSTEM, OTHER SPEAKERS INCLUDE: (PA) PUBLIC ADDRESS; (CS) CLASSROOM SOUND FIELD. SUBSCRIPT "P" INDICATES PENDANT MOUNTED. SUBSCRIPT "V" INDICATES THAT THE SPEAKER IS VOLUME CONTROLLED.
[M]	274100, 275120, 275127	MICROPHONE FLOOR OUTLET. SUBSCRIPT NUMBER INDICATES QUANTITY OF OUTLETS REQUIRED. (BLANK IMPLIES ONLY ONE) FLOOR BOX SPECIFIED ON THE POWER PLANS UNLESS OTHERWISE NOTED.
[M]	274100, 275120, 275127	HANGING MIC FROM CEILING.
[DMI]	275120	SOUND SYSTEM WALL MOUNTED DIGITAL MEDIA INPUT PLATE (1) HDMI, (1) USB, (1) MINI STEREO, (1) DISPLAY PORT.
[MON#]	275120	WALL MOUNTED MONITOR SPEAKER OUTLET. SUBSCRIPT NUMBER INDICATES QUANTITY OF OUTLETS REQUIRED. (BLANK IMPLIES ONE)
[MON#]	275120	MONITOR SPEAKER FLOOR OUTLET. SUBSCRIPT NUMBER INDICATES QUANTITY OF OUTLETS REQUIRED (BLANK IMPLIES ONLY ONE); FLOOR BOX SPECIFIED ON THE POWER PLANS UNLESS OTHERWISE NOTED.
[TP]	274000, 275120	TOUCH PANEL - WALL MOUNTED AUDIO VIDEO CONTROL INTERFACE.
[T]	273123	TELEPHONE HANDBOOK - PLACED ON DESKTOP.
[TIC]		THEATER INTERCOM SPEAKER STATION. (TICM), PRODUCTION INTERCOM MAIN CONTROL.
[PI]		PRODUCTION INTERCOM INPUT PLATE
[H]	275116	PUBLIC ADDRESS HORN
[IR]	275127	CLASSROOM SOUNDFIELD INFRARED RECEIVER.
[2]	275313	WALL-MOUNTED DUAL FACE CLOCK.
[1]	275313	WALL-MOUNTED SINGLE FACE CLOCK.
[1]	275313	WALL-MOUNTED SINGLE FACE PUBLIC ADDRESS IP SPEAKER WITH DIGITAL CLOCK DISPLAY, LED FLASHERS, AND TALKBACK MICROPHONE.
[1]	275313	WALL-MOUNTED DUAL FACE PUBLIC ADDRESS IP SPEAKER WITH DIGITAL CLOCK DISPLAY, LED FLASHERS, AND TALKBACK MICROPHONE.
[1]	275313	WALL-MOUNTED SINGLE FACE DIGITAL CLOCK DISPLAY AND LED FLASHERS.
[1]	275313	WALL-MOUNTED DUAL FACE DIGITAL CLOCK DISPLAY AND LED FLASHERS.

**SECURITY SYMBOLS**

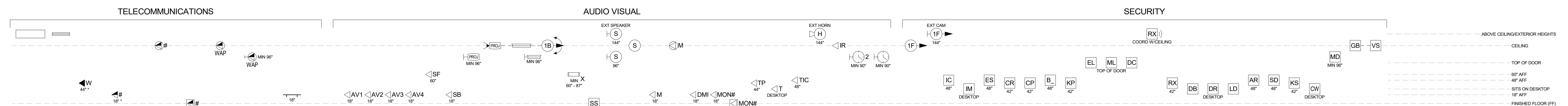
SYMBOL	SECTION	DESCRIPTION
[1F]	282300	SINGLE SENSOR FIXED IP-CCTV SECURITY CAMERA. PROVIDE (1) UTP CABLE AND OUTLET.
[2F]	282300	DUAL SENSOR FIXED IP-CCTV SECURITY CAMERA. PROVIDE (1) UTP CABLE AND OUTLET.
[1P]	282300	SINGLE SENSOR PTZ IP-CCTV SECURITY CAMERA. PROVIDE (1) UTP CABLE AND OUTLET.
[4F]	282300	QUAD SENSOR FIXED IP-CCTV SECURITY CAMERA. PROVIDE (1) UTP CABLE AND OUTLET.
[4F]	282300	QUAD SENSOR 180 DEGREE FIXED IP-CCTV SECURITY CAMERA. PROVIDE (1) UTP CABLE AND OUTLET.
[360]	282300	SINGLE SENSOR 360 DEGREE FIXED IP-CCTV SECURITY CAMERA. PROVIDE (1) UTP CABLE AND OUTLET.
[IC]	281523	INTERCOM DOOR STATION
[IC]	281523	INTERCOM DOOR STATION W/VIDEO
[IM]	281523	MASTER INTERCOM DOOR STATION
[ES]	281523	EMERGENCY CALL STATION
[CR]	281300	CARD READER
[CP]	281300	CARD READER WITH PIN PAD
[B]	281300	BIOMETRIC READER DEVICE ("_" INDICATES F-FINGER, H-HAND, I-IRIS, S-SIGNATURE, V-VOICE)
[KP]	281300	ARM/DISARM KEYPAD
[EL]	281300	ELECTRIC LOCK
[ML]	281300	MAGNETIC LOCK
[DC]	281300	DOOR CONTACT
[RX]	281300	REQUEST TO EXIT MOTION
[RX]	281300	REQUEST TO EXIT PUSH BUTTON
[DB]	281300	DURESS BUTTON
[DR]	281300	DOOR RELEASE STATION
[LD]	281300	LOCK DOWN BUTTON
[AR]	281300	AREA OF REFUGE
[SD]	281300	SCREENING DEVICE
[KS]	281300	KEY SWITCH
[CW]	281300	CLIENT WORKSTATION
[MD]	281300	MOTION DETECTOR
[GB]	281300	GLASS BREAK SENSOR
[VS]	281300	VIBRATION SENSOR
[WL]	281300	WIRELESS LOCK
[WG]	281300	WIRELESS LOCK GATEWAY

**ABBREVIATIONS**

A	AMPERES
ABO	ALTERNATIVE BID OPTIONS
AC	ACCESS CONTROL SYSTEM
ACS	ACCESS CONTROL SYSTEM
AFF	ABOVE FINISHED FLOOR
AF	ABOVE FINISHED CEILING
AHJ	AUTHORITY HAVING JURISDICTION
AL	ALUMINUM
ANNUN	ANNUNCIATOR
ARCH	ARCHITECT
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
AVOIP	AUDIO VISUAL OVER INTERNET PROTOCOL
AWG	AMERICAN WIRE GAUGE
BFG	BELOW FINISHED GRADE
BKBD	BACKWARD
BLDG	BUILDING
BOTT	BOTTOM
C	CONDUIT
CAB	CABINET
CAT	CATEGORY
CATV	COMMUNITY ANTENNA TELEVISION
CCTV	CLOSED CIRCUIT TELEVISION
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTALLED
CKT	CIRCUIT
CLG	CEILING
CLST	CLOSET
CO	COMMUNICATIONS OUTLET
COAX	COAXIAL
COMM	COMMUNICATIONS
CT	CABLE TRAY
CU	COPPER
C/B	CIRCUIT BREAKER
C/T	CURRENT TRANSFORMERS
Δ	DELTA
DC	DIRECT CURRENT
DEG	DEGREE
DEM	DEMOLITION
DEPT	DEPARTMENT
DIA	DIAMETER
DISC	DISCONNECT
DIST	DISTRIBUTION
DN	DOWN
DEEP	DEEP OR DEPTH
DPOT	DOUBLE POLE DOUBLE TRANSFER DRAWING
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EES	EARTH ELECTRODE SYSTEM
EF	ENTRANCE FACILITY
ELEC	ELECTRIC, ELECTRICAL
EMT	ELECTRIC METALLIC TUBING
EQUIP	EQUIPMENT
ER	EQUIPMENT ROOM
ESS	ELECTRONIC SAFETY & SECURITY
EXIST	EXISTING
FT	FEET
GND	GROUND
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPT
HH	HANDHOLE
IAW	IN ACCORDANCE WITH
IBC	INTERNATIONAL BUILDING CODE
IDF	INTERMEDIATE DISTRIBUTION FRAME
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IP	INTERNET PROTOCOL
JB	JUNCTION BOX
KVA	KILOVOLT - AMPERES
KW	KILOWATTS
LAN	LOCAL AREA NETWORK
MAX	MAXIMUM
MC	MAIN CROSS-CONNECT
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MILS
MER	MAIN EQUIPMENT ROOM
MH	MAINTENANCE HOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MM	MULTIMODE FIBER
MNS	MASS NOTIFICATION SYSTEM
MON	MONITOR
MTD	MOUNTED
MTG	MOUNTING
NO	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NOT	NOT IN CONTRACT
NIC	NIGHT LIGHT CIRCUIT
NL	NORMALLY OPEN
NO	NOT TO SCALE
NTS	NOT TO SCALE
OC	ON CENTER
OFC	OPTIC FIBER CABLE
OFCI	OWNER FURNISHED OWNER INSTALLED
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OICF	OWNER INSTALLED CONTRACTOR FURNISHED
OMB	LASER OPTIMIZED MULTIMODE, CLASS 3
OS	OCCUPANCY SENSOR
OSP	OUTSIDE PLANT
PB	PULL BOX
PET	PROTECTED ENTRANCE TERMINAL
PR	PAIR
PT	POKE THRU
PTZ	PAN-TILT-ZOOM
PVC	POLYVINYL CHLORIDE
PWR	POWER
R	RECESSED
RGS	RIGID GALVANIZED STEEL
ROOM	ROOM
RMC	RIGID METAL CONDUIT
RU	RACK UNIT
SCR	SHORT CIRCUIT RATING
SCTP	SCREENED TWISTED PAIR
SF	SQUARE FEET
SHT	SHEET
SPEC	SPECIFICATIONS
STD	STANDARD
SURF	SURFACE
TBD	TO BE DETERMINED
TEL	TELEPHONE
TER	TELECOMMUNICATIONS EQUIP. ROOM
TR	TELECOMMUNICATIONS ROOM
TV	TELEVISION
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORIES
UNIV	UNIVERSAL
UNW	UNLESS OTHERWISE NOTED
UTP	UNSHIELDED TWISTED PAIR
V	VOLTS
VIF	VERIFY IN FIELD
VOIP	VOICE OVER INTERNET PROTOCOL
VSS	VIDEO SURVEILLANCE SYSTEM
W	WATTS
W/	WITH
WAP	WIRELESS ACCESS POINT
WP	WEATHERPROOF
WPG	WEATHERPROOF WITH GROUND
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
Y	WYE
3R	NEMA 3R ENCLOSURE
4X	NEMA 4X ENCLOSURE

**TYPICAL COMPONENT MOUNTING HEIGHTS**

NOTES  
 - ALL DIMENSIONS SHOWN ARE ABOVE FINISHED FLOOR (AFF) OR ABOVE GRADE (AG) TO CENTERLINE OF COMPONENT.  
 - USE STANDARD MOUNTING HEIGHTS UNLESS OTHERWISE NOTED. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL MOUNTING HEIGHT DETAILS. PROJECT PLANS AND DETAILS MAY PROVIDE ADDITIONAL GUIDANCE.



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sheet name: TECHNOLOGY LEGENDS

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**GENERAL NOTES**

- 1 NOT ALL NOTES INDICATED ON THIS SHEET MAY BE APPLICABLE FOR ALL PROJECT CONDITIONS. NOTES APPEARING ON VARIOUS DRAWINGS FOR DIFFERENT SYSTEMS AND MATERIALS ARE TO BE REVIEWED, COORDINATED AND ARE TO BE APPLIED TO ALL RELATED DRAWINGS AND DETAILS.
- 2 THE DRAWINGS INDICATE THE QUANTITY, TYPE AND GENERAL LOCATION OF VOICE/DATA/CATV/AUDIO/VIDEO OUTLETS REQUIRED IN EACH SPACE. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, AND PROJECT MANAGEMENT NECESSARY FOR A TURNKEY SYSTEM.
- 3 ALL MATERIALS SPECIFIED OR NOTED SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
- 4 THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, LICENSES, AND ALL UTILITY CHARGES, AND ARRANGE FOR ALL REQUIRED INSPECTIONS.
- 5 REFER TO THE ARCHITECTURAL INTERIOR ELEVATIONS FOR DEVICE LOCATIONS AND MOUNTING HEIGHTS FOR ADDITIONAL DETAILS. COORDINATE EXACT DEVICE LOCATIONS PRIOR TO ROUGH-IN.
- 6 ALL BIDDERS SHALL VISIT AND EXAMINE THE SITE. ANY DISCREPANCIES BETWEEN DRAWINGS AND SPECIFICATIONS SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION DURING THE BIDDING PERIOD. NO ALLOWANCE SHALL BE MADE TO THE CONTRACTOR FOR FAILURE TO IDENTIFY DISCREPANCIES DURING THE BIDDING PERIOD.
- 7 THE CONTRACTOR SHALL INCLUDE ALL OVERTIME AND PREMIUM TIME WORK THAT MUST BE PERFORMED DURING THE PERIOD OF PERFORMANCE. NO ADDITIONAL COMPENSATION WILL BE AWARDED FOR OVERTIME WORK.
- 8 COORDINATE EXACT LOCATIONS OF EQUIPMENT WITH OTHER TRADES. VERIFY EXACT WIRING AND CONNECTION REQUIREMENTS WITH SUBMITTAL DOCUMENTS BEFORE INSTALLATION. SPECIALTY OUTLET TYPES SHALL BE VERIFIED BEFORE ORDERING. ALL ELECTRICAL AND COMMUNICATION WORK SHOWN HERE MUST BE VERIFIED AND COORDINATED IN FIELD BEFORE INSTALLATION.
- 9 THE CONTRACTOR SHALL PROTECT ALL EXISTING AND NEW CONSTRUCTION FROM DAMAGE. EXISTING CEILINGS, WALLS, FLOORS AND ALL OTHER BUILDING COMPONENTS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION IF DAMAGED. ALL DAMAGES TO THE BUILDING OR ITS CONTENTS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR RESPONSIBLE FOR THE DAMAGE TO THE OWNERS SATISFACTION.
- 10 ALL NEW CONSTRUCTION SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) AND CHAPTER 11 OF THE INTERNATIONAL BUILDING CODE.
- 11 ALL WORK REQUIRING POWER OR COMMUNICATION OUTAGES OR DISRUPTION OF OWNER FUNCTIONS SHALL BE COORDINATED WITH THE PROJECT ENGINEER, OWNER AND OWNER ITS DEPARTMENT. REQUESTS FOR NOTIFICATIONS OF, AND APPROVALS FOR OUTAGES AND DISRUPTIONS SHALL BE MADE TO OWNER AND THE ENGINEER IN WRITING, 2 WEEKS PRIOR TO THE REQUESTED OUTAGE DATE. OUTAGES SHALL NORMALLY OCCUR DURING THE OWNER'S "OFF" HOURS.
- 12 ALL COMMUNICATION WORK SHALL BE INSTALLED BY CERTIFIED CONTRACTORS AND THEIR EMPLOYEES PER THE CONTRACT DOCUMENTS.
- 13 THE CONTRACTOR SHALL COORDINATE ALL EQUIPMENT INSTALLATION TO MAINTAIN HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. THE CONTRACTOR SHALL COORDINATE SYSTEMS INSTALLATION TO MINIMIZE CONFLICT WITH EXISTING BUILDING UTILITIES AND OTHER TRADES WORK.
- 14 THE CONTRACTOR SHALL VERIFY EQUIPMENT RACK AND CABINET PLACEMENT AND LAYOUT WITH OWNER AND OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- 15 ANY LOW VOLTAGE CABLING IN AN OPEN CEILING AREA (EXAMPLE GYMNASIUM) SHALL BE INSTALLED IN CONDUIT TO THE NEAREST ACCESSIBLE CABLE TRAY OR TELECOM ROOM (TR) UNLESS NOTED OTHERWISE.
- 16 ALL INSTALLATIONS OF EXPOSED EQUIPMENT SHALL BE COORDINATED WITH ASSOCIATED ARCHITECTURAL DETAILS TO MEET INTENDED AESTHETIC APPEARANCE. ALL WIRING, CONDUITS, BACK BOXES AND OTHER ASSOCIATED CONNECTIONS SHALL BE CONCEALED BEHIND EQUIPMENT OR WITHIN EXPOSED MOUNTED BRACKETS. EXPOSED WIRING IS PROHIBITED.
- 17 THE COLOR AND FINISH OF ALL EXPOSED DEVICES IN PUBLIC AREAS SHALL BE REVIEWED AND APPROVED BY THE ARCHITECT PRIOR TO INSTALLATION.
- 18 ALL CONDUIT FRAMING SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CONDUITS SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO WALLS. ANGLED CONDUITS ARE PROHIBITED.
- 19 INCLUDE ALL REQUIRED JUNCTION AND PULL BOXES REGARDLESS OF INDICATION ON THE DRAWINGS (WHICH DUE TO THE SYMBOLIC METHODS OF NOTATION, MAY BE OMITTED).
- 20 PULL-BOXES SHALL BE PROVIDED WHERE THE COMBINED SUM OF THE BENDS EXCEEDS 180 DEGREES AND/OR EVERY 100 LINEAR FEET. THE BEND RADIUS FOR CONDUITS SHALL BE 10X THE OUTSIDE DIAMETER FOR OPTICAL FIBER AND 4X THE OUTSIDE DIAMETER FOR MULTIPAIR COPPER.
- 21 PROVIDE LONG SWEEPING BENDS FOR AL COMMUNICATIONS CONDUITS 2-INCHES AND LARGER. LB FITTINGS FOR COMMUNICATION CONDUITS ARE PROHIBITED.
- 22 PROVIDE PULL TAPE IN ALL EMPTY CONDUIT AND INNERDUCT. PULL TAPE SHALL BE RATED FOR 200 LBS IN ALL CONDUIT.
- 23 CABLE TRAY SHALL BE TRAPEZE OR CANTILEVER MOUNTED ONLY. BOND ALL SECTIONS OF TRAY TOGETHER WITH MANUFACTURER APPROVED BONDING METHOD PER NEC. ALL CABLE TRAY TO BE 12-INCHES WIDE, UON. CABLE TRAY SHALL BE PROVIDED WITH 25 PERCENT SPARE CAPACITY.
- 24 PROVIDE A MINIMUM OF FOUR (4) CONDUITS BETWEEN STACKED CLOSETS ON SUCCESSIVE FLOORS.
- 25 ALL COMMUNICATIONS OUTLET BOXES SHALL BE A 4 11/16-INCH SQUARE BY 2 1/2-INCH DEEP WITH A MUD RING UON. PROVIDE A MINIMUM OF ONE (1) 1-INCH CONDUIT FOR ALL COMMUNICATIONS OUTLET BOXES. REFER TO COMMUNICATIONS DETAILS FOR SPECIFIC OUTLET BOX AND CONDUIT QUANTITY AND SIZE INFORMATION.
- 26 ALL EQUIPMENT SHALL BE NEW, UON.
- 27 BOND ALL METALLIC EQUIPMENT, RACKS, CABINETS, CABLE TRAY, CONDUITS, SLEEVES, ETC. TO THE TELECOMMUNICATIONS MAIN GROUND BUS WITH 2-HOLE NON-TWISING LUGS. ALL CONDUITS SHALL BE REAMED WITH BUSHINGS INSTALLED.
- 28 PROVIDE ALL CORE DRILLING, CUTTING, AND PATCHING AND RESTORATION OF ALL FINISHED AREAS REQUIRED TO INSTALL ALL CONDUITS, SLEEVES, BOXES, ETC. SEAL ALL CORE DRILLS AFTER RACEWAY, CONDUITS, ETC. ARE INSTALLED.
- 29 PLACEMENT OF UNAUTHORIZED CABLING IN THE COMMUNICATIONS PATHWAYS I.E. CABLETRAY, J HOOKS, RACEWAY, ETC. IS PROHIBITED.
- 30 ALL SLEEVES AND PENETRATIONS SHALL BE ACOUSTICALLY AND FIRE TREATED TO MEET WALL RATING. FIRESTOPPING ASSEMBLIES SHALL BE PROVIDED AT PENETRATIONS OF CONDUITS, BUS DUCTS, CABLES, CABLE TRAYS AND OTHER COMMUNICATIONS ITEMS. REFER TO THE THROUGH PENETRATION FIRESTOPPING SPECIFICATION FOR COMPLETE REQUIREMENTS.

**GENERAL DEMOLITION NOTES**

- 1 CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS WITH RESPECT TO MATERIALS AND DIMENSIONS TO DETERMINE THE EXACT EXTENT OF DEMOLITION WORK.
- 2 AREAS INDICATED FOR DEMOLITION ARE APPROXIMATE. THERE MAY BE CONDITIONS WHERE DEMOLISHED UTILITIES ARE NOT WHERE INDICATED ON DRAWINGS. FULL EXTENT OF DEMOLITION SHALL BE DETERMINED AT THE JOB SITE BY THE CONTRACTOR.
- 3 ALL NECESSARY CARE SHALL BE TAKEN DURING DEMOLITION AND CONSTRUCTION TO PREVENT DAMAGE TO ADJACENT MATERIALS AND CONCEALED MECHANICAL, ELECTRICAL, PLUMBING, AND OTHER ITEMS.
- 4 PRIOR TO COMMENCING DEMOLITION WORK, VERIFY ALL UTILITIES HAVE BEEN TURNED OFF AND/OR CAPPED AS REQUIRED IN AREAS WHERE DEMOLITION IS TO OCCUR.
- 5 DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
- 6 SEE ARCHITECTURAL, FIRE PROTECTION, PLUMBING, MECHANICAL, ELECTRICAL, AND STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL DEMOLITION REQUIREMENTS.
- 7 ALL WORK AND EQUIPMENT SHALL CONFORM TO NEC. THE MEANS AND METHODS USED BY THIS CONTRACTOR SHALL CONFORM TO NEC SECTION 110-3 (a AND b).
- 8 WHERE INDICATED, ALL FIBER CABLE, DATA CABLE, RF CABLE, AND AUDIO-VISUAL CABLING SHALL BE DISCONNECTED AND REMOVED FROM THE OUTLET BOXES TO THEIR SOURCE ENDPOINTS.
- 9 CONTRACTOR SHALL REMOVE TELECOMMUNICATIONS DATA OUTLETS, EQUIPMENT, CABLING AND ALL RELATED ITEMS. PROPERLY DISPOSE OR RECYCLE ALL DEMOLISHED ITEMS PER LOCAL CODE AND AHJ REQUIREMENTS.
- 10 IN EXISTING COMMUNICATIONS ROOMS, THE CONTRACTOR SHALL COORDINATE THE EXTENT OF COMMUNICATIONS DEMOLITION WITH THE OWNER.

**GENERAL TELECOM NOTES**

- 1 ALL WORK SHALL COMPLY WITH APPLICABLE TIA/EIA/BICSI STANDARDS.
- 2 FIELD COORDINATE THE LOCATION OF COMMUNICATIONS EQUIPMENT IN ALIGNMENT WITH APPLICABLE CODES.
- 3 THE CONTRACTOR SHALL COORDINATE DEVICE OUTLET LOCATIONS WITH ARCHITECTURAL AND CASEWORK DRAWINGS PRIOR TO ROUGH-IN. REPORT ANY CONFLICTS TO THE CM, ARCHITECT, AND ENGINEER FOR RESOLUTION.
- 4 ALL COMMUNICATIONS CABLING SHALL BE INSTALLED IN CONDUITS, CABLE TRAY, OR AN APPROVED RACEWAY SYSTEM. WHERE CABLE TRAY, CONDUIT, OR RACEWAY IS NOT AVAILABLE ALL CABLES SHALL BE INSTALLED IN J-HOOKS SUPPORTED EVERY 5- FEET, SUFFICIENT IN SIZE TO HANDLE ALL BUNDLED CABLES WHILE MINIMIZING CRUSHING. COPPER AND FIBER OPTIC CABLES WILL BE DIVIDED INTO SEPARATE BUNDLES AND INSTALLED IN SEPARATE J-HOOKS. IF CABLE SLACK EXCEEDS 12-INCHES BETWEEN SUPPORTS, ADDITIONAL SUPPORTS WILL BE INSTALLED TO TAKE UP SLACK AND RELIEVE CABLE STRESS.
- 5 CATEGORY 6A CABLES SHALL BE CONTINUOUS FROM TELECOM ROOM TO WORK AREA OUTLET AND FREE FROM SPLICES, REVERSES, GROUNDS, OR OTHER CONNECTIONS. PROVIDE A 5-FOOT SERVICE LOOP IN THE CEILING (AT THE WORK AREA END) FOR EACH HORIZONTAL CABLE.
- 6 DO NOT INSTALL CATEGORY 6A HORIZONTAL CABLES THAT EXCEED 90 METERS.
- 7 ALL COPPER TERMINATION HARDWARE SHALL BE 110 STYLE IDC, UON.
- 8 COMMUNICATIONS CABLING SHALL NOT BE SPLICED, UON.
- 9 COMMUNICATIONS CONDUIT FILL CAPACITIES ARE GOVERNED BY THE NFPA-70 (NEC) AND SHALL BE FOLLOWED. DO NOT EXCEED 40 PERCENT FILL ON ANY COMMUNICATIONS CONDUIT.
- 10 CAREFULLY LAY ALL CABLE WITH APPROPRIATE RADIUS OF CURVATURE AND PROTECT AT BENDS AND CORNERS. OBSERVE MINIMUM BEND RADIUS AND TENSION LIMITATIONS AS SPECIFIED BY TIA. ANY ADDITIONAL SLEEVES AND/OR PENETRATIONS REQUIRED FOR THE INSTALLATION OF COMMUNICATIONS SYSTEM CABLING NOT SHOWN ON THESE DRAWINGS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- 11 THE CONTRACTOR SHALL ENSURE THAT ALL INSTALLED CABLES ARE FREE FROM TWISTS, KINKS, SHARP BENDS, CUTS, GOUGES OR ANY OTHER PHYSICAL DAMAGE.
- 12 MONITOR CABLE PULL TENSION TO ENSURE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY STANDARDS ARE NOT EXCEEDED.
- 13 ALL CATEGORY 6A CABLING MAY BE ROUTED IN THE SAME PATHWAY.
- 14 THE CONTRACTOR SHALL ENSURE ALL CATEGORY 5E/6A CABLING IS SEPERATED FROM LIGHTING, POWER, 70-VOLT AUDIO, MICROPHONE LEVEL, RF, AND SPEAKER LEVEL CIRCUITS IAW TIA-568 GENERIC TELECOMMUNICATIONS CABLING FOR CUSTOMER PREMISES.
- 15 CABLING ASSOCIATED WITH THE WIRELESS ACCESS POINTS SHALL BE PROVIDED WITH A COIL OF CABLE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ADJUST THE LOCATIONS OF THE WIRELESS ACCESS POINTS, AS REQUIRED, AFTER CONDUCTING A SITE VERIFICATION SURVEY TO ENSURE COVERAGE THROUGHOUT THE FACILITY.
- 16 ALL HORIZONTAL AND BACKBONE COMMUNICATIONS CABLING SHALL BE PLENUM RATED, UON. ANY LOW VOLTAGE DEVICE INSTALLED IN A PLENUM-RATED ENVIRONMENT MUST BE RATED FOR PLENUM USE.
- 17 ALL COMMUNICATIONS CABLING INSTALLED UNDER THE FLOOR SLAB SHALL BE WET-LISTED. CONCEAL CABLING WITHIN CONDUIT BACK TO THE TERMINATION LOCATION OR TRANSITION TO PLENUM RATED CABLING ABOVE THE CEILING.
- 18 ALL COMMUNICATIONS CABLING SHALL BE PROTECTED FROM EXPOSURE TO PAINT OR ANY OTHER FOREIGN MATERIAL THAT WOULD NEGATIVELY IMPACT THE VALIDITY OF THE MANUFACTURER'S PERFORMANCE WARRANTY, IF ANY CABLE IS EXPOSED TO PAINT AT ANY POINT, REGARDLESS OF THE AMOUNT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING THE CABLE(S) AFFECTED AND WILL REPLACE THE CABLE(S) AT NO COST TO THE OWNER PER THE INSTALLATION SPECIFICATIONS INCLUDING TESTING.
- 19 PROVIDE ALL COPPER PATCH CORDS AND OPTICAL FIBER JUMPERS AT BOTH THE WORK AREA AND TELECOM ROOM ENDS. REFER TO THE SPECIFICATIONS FOR ADDITIONAL DETAILS.
- 20 ALL LABELING SHALL COMPLY WITH TIA-606 ADMINISTRATION STANDARD FOR TELECOMMUNICATIONS INFRASTRUCTURE. PROVIDE LABELING FOR ALL MODULAR OUTLETS, FACEPLATES, PATCH PANELS, CABLES, PATCH CABLES, FIBER SPLICE TRAYS, RACKS, CABINETS, TMCB/TGBS, ETC. REFER ELSEWHERE IN THE DRAWINGS AND SPECIFICATIONS FOR THE OWNER'S EXACT REQUIREMENTS.
- 21 TELECOMMUNICATIONS FACEPLATES SHALL MATCH ELECTRICAL SWITCH AND ELECTRICAL RECEPTACLE PLATE FINISHES.
- 22 EQUIPMENT CABINETS AND PATCH PANELS SHALL BE ARRANGED TO ALLOW FOR A NATURAL WIRING PROGRESSION IN FUNCTIONAL FIELDS. MINIMIZE CROSSING OF WIRES AND ALLOW FOR EASY ACCESS TO ALL COMPONENTS.
- 23 SURFACE MOUNTED RACEWAY SHALL BE USED BELOW 4'-IN CEILING IN REMODED AREA WHERE CONDUIT, WIRING AND DEVICES CANNOT BE CONCEALED. PROVIDE WIREMOLD 4000 SERIES OR EQUAL, UON. PROVIDE COMPLETE WITH ALL FITTINGS, BARRIERS, COVERS AND MOUNTING ACCESSORIES AS RECOMMENDED BY THE MANUFACTURER. COORDINATE ROUTING OF RACEWAY WITH ARCHITECT PRIOR TO ROUGH-IN.

**GENERAL AUDIO VISUAL NOTES**

- 1 SUPPLY ALL JACKS, RACKS, WIRE, CABINETS, CONNECTORS, MATERIALS, PARTS, EQUIPMENT AND LABOR NECESSARY FOR THE COMPLETE INSTALLATION OF THE SYSTEMS, IN FULL ACCORDANCE WITH THE RECOMMENDATIONS OF THE EQUIPMENT MANUFACTURERS AND WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
- 2 REFER TO FLOW DIAGRAMS, RISERS, AND SPECIFICATIONS FOR COMPLETE OPERATIONAL REQUIREMENTS. CONTRACTOR IS TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.
- 3 WHERE SIGNAL TYPES ARE PROVIDED AND NO CABLE TYPE INDICATED THE CONTRACTOR SHALL PROVIDE THE APPROPRIATE INTERCONNECT CABLE BASED ON THE SIGNAL TYPE REQUIREMENTS.
- 4 ALL JUNCTION BOXES IN WALLS AND CEILINGS SHALL BE FLUSH MOUNTED. CONDUITS SHALL BE CONCEALED, UON.
- 5 STRUCTURAL SUPPORT FOR AUDIOVISUAL EQUIPMENT SHALL BE PROVIDED BY OTHERS AT LOCATIONS DESIGNATED ON THESE DRAWINGS. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, BLOCKING FOR WALL MOUNTED DEVICES AND OVERHEAD SUPPORT FOR CEILING MOUNTED PROJECTORS AND PROJECTION SCREENS. REFER TO ARCHITECTURAL DRAWINGS FOR SUPPORT DETAILS AND REQUIREMENTS.
- 6 CEILING MOUNTED SPEAKER ENCLOSURES SHALL BE SUPPORTED FROM OVERHEAD STRUCTURE.
- 7 ALL EXPOSED INTERCONNECT CABLES SHALL BE MOLDED CONNECTOR TYPE. FIELD TERMINATED INTERCONNECT CABLES ARE PROHIBITED.
- 8 FURNITURE LAYOUT INDICATED ON DRAWINGS IS NOT FINAL AND MAY DIFFER. COORDINATE FINAL FURNITURE CONFIGURATION WITH OWNER PRIOR TO FABRICATION/CONSTRUCTION.
- 9 TERMINAL BLOCK, BOARDS, STRIPS, OR CONNECTORS SHALL BE FURNISHED FOR ALL CABLES, WHICH INTERFACE WITH RACKS, CABINETS, CONSOLES, OR EQUIPMENT MODULES.
- 10 ROUTE ALL CABLE AND WIRING WITHIN EQUIPMENT RACKS ACCORDING TO FUNCTION. SEPARATING WIRES OF DIFFERENT SIGNAL LEVELS (MICROPHONE, LINE LEVEL, AMPLIFIER OUTPUT, AC, ETC.) BY AS MUCH DISTANCE AS POSSIBLE. NEATLY ARRANGE AND BUNDLE ALL CABLE LOOSELY WITH HOOK-N-LOOP TIES.
- 11 POWER CABLES, CONTROL CABLES, AND HIGH-LEVEL CABLES SHALL BE INSTALLED ON THE LEFT SIDE OF AN EQUIPMENT RACK, AS VIEWED FROM THE REAR. ALL OTHER CABLES SHALL BE INSTALLED ON THE RIGHT SIDE OF THE EQUIPMENT RACK, AS VIEWED FROM THE REAR.
- 12 CABLING WITHIN RACKS SHALL BE CONTAINED IN "FINGER TRAY" OR HOOK-N-LOOP TIED TO THE SIDE OF THE RACK IN A NEAT AND ORDERLY FASHION.
- 13 ALL CABLES ROUTED OUTSIDE OF RACKS AND CONDUIT SHALL BE CONTAINED IN A SUITABLE HARNESS OR WIREWAY TO MAINTAIN A NEAT AND CLEAN INSTALLATION.
- 14 OBSERVE PROPER CIRCUIT POLARITY AND LOUDSPEAKER WIRING POLARITY. NO CABLES SHALL BE WIRED WITH A POLARITY REVERSAL BETWEEN CONNECTIONS, AT EITHER END.
- 15 ALL CABLES SHALL BE CONTINUOUS LENGTHS WITHOUT SPLICES. ALL SYSTEM WIRE (EXCEPT SPARE WIRE, AFTER BEING CUT AND STRIPPED) SHALL HAVE THE WIRE STRAND TWISTED BACK TO THEIR ORIGINAL LAY AND BE TERMINATED BY APPROVED SOLDERED OR MECHANICAL MEANS.
- 16 CLEARLY AND PERMANENTLY LABEL ALL JACKS, CONTROLS, CONNECTIONS, AND SO FORTH. ALL LABELING SHALL BE COMPLETED PRIOR TO FINAL SYSTEM EQUALIZATION. HAND LABELING IS PROHIBITED.
- 17 ALL EQUIPMENT SHALL BE HELD FIRMLY IN PLACE WITH APPROPRIATE MOUNTING HARDWARE. ALL EQUIPMENT SHALL BE INSTALLED TO PROVIDE REASONABLE SAFETY TO THE OPERATOR. SUPPLY ADEQUATE VENTILATION FOR ALL ENCLOSED EQUIPMENT ITEMS WHICH PRODUCE HEAT.
- 18 A MOCK-UP AND MEETING SHALL OCCUR FOR TYPICAL PRESENTATION WALL TECHNOLOGY WHERE INTERACTIVE PROJECTORS AND/OR INTERACTIVE FLAT PANELS OCCUR. WALL SHALL BE FINISHED AND PROJECTOR MARKERBOARD AND/OR VISUAL WALL DISPLAY WALLCOVERING, INTERACTIVE PROJECTOR AND/OR INTERACTIVE FLAT PANEL, DATA AND AV CONNECTIVITY, ELECTRICAL AND ALL ACCESSORIES SHALL BE INSTALLED. CONSTRUCTION MANAGER, ARCHITECT, PROJECTOR MARKERBOARD AND/OR VISUAL DISPLAY WALLCOVERING INSTALLER/CONTRACTOR, TECHNOLOGY INSTALLER/CONTRACTOR, AND ELECTRICAL INSTALLER/CONTRACTOR SHALL BE PRESENT TO REVIEW MOCK-UP. PURPOSE OF MOCK-UP IS TO CONFIRM INTERACTIVE TECHNOLOGY IS FUNCTIONING AS INTENDED, THAT THERE IS PROPER COORDINATION BETWEEN THE WALL SURFACE, THE PROJECTOR MARKERBOARD OR VISUAL DISPLAY WALLCOVERING AND THE INTERACTIVE PROJECTOR AND/OR INTERACTIVE FLAT PANEL. ALL FINAL MOUNTING HEIGHTS FOR DIFFERENT ROOMS AND SPACES SHALL BE CONFIRMED AT THE MOCK-UP REVIEW.

**AUDIO VISUAL SYSTEM ROUGH IN AND INFRASTRUCTURE RECOMMENDATIONS**

- 1 LARGE DISPLAYS (70"AND UP): BACK BOX WITH AC RECEPTACLES AND SURGE PROTECTION WITH FLANGE AND COVER CHIEF PAC525FBP2; PROVIDE A MINIMUM OF ONE NETWORK DATA DROP FOR DISPLAY. (ONE NETWORK DROP FOR WIRELESS GATEWAY).
- 2 DIGITAL SIGNAGE DISPLAYS: BACK BOX WITH FLANGE AND COVER CHIEF PAC525FCW OR CHIEF PAC525FBP2 AC RECEPTACLES AND SURGE PROTECTION WITH FLANGE AND COVER; PROVIDE A MINIMUM OF TWO NETWORK DATA DROPS ONE FOR DISPLAY ONE FOR SIGNAGE PLAYER.
- 3 DISPLAYS (70" AND BELOW): BACK BOX WITH FLANGE AND COVER CHIEF PAC525FCW OR CHIEF PAC525FBP2 AC RECEPTACLES AND SURGE PROTECTION WITH FLANGE AND COVER; PROVIDE A MINIMUM OF ONE NETWORK DATA DROP FOR DISPLAY. (ONE NETWORK DROP FOR WIRELESS GATEWAY).
- 4 AUDIO INPUT PLATE: (PASSIVE) 2 GANG BOX WITH PLASTER RING TOTAL DEPTH OF AT LEAST 3 1/2".
- 5 DIGITAL MEDIA PLATE: (ACTIVE) MIDDLE ATLANTIC EVOLUTION 4-GANG WALL BOX OR 8-GANG WALL BOX.
- 6 DANTE I/O PLATE: (ACTIVE) MIDDLE ATLANTIC EVOLUTION 4-GANG WALL BOX OR 8-GANG WALL BOX.
- 7 SDI CAMERA: SINGLE OR 2 GANG BOX WITH PLASTER RING TOTAL DEPTH OF AT LEAST 3 1/2".
- 8 AV CONTROL TOUCH PANEL: 2 GANG BOX WITH PLASTER RING TOTAL DEPTH OF AT LEAST 3 1/2".
- 9 AUDIO VISUAL FLOOR POKE THRU MIDDLE ATLANTIC EVOLUTION 8" OR 10" POKE THRU WITH RECEPTACLES, COVER AND INTERIOR PLATE OPTIONS.

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sheet name: TECHNOLOGY NOTES

drawn by: **CMD**

checked by: **CB**

sheet number: **T-002**

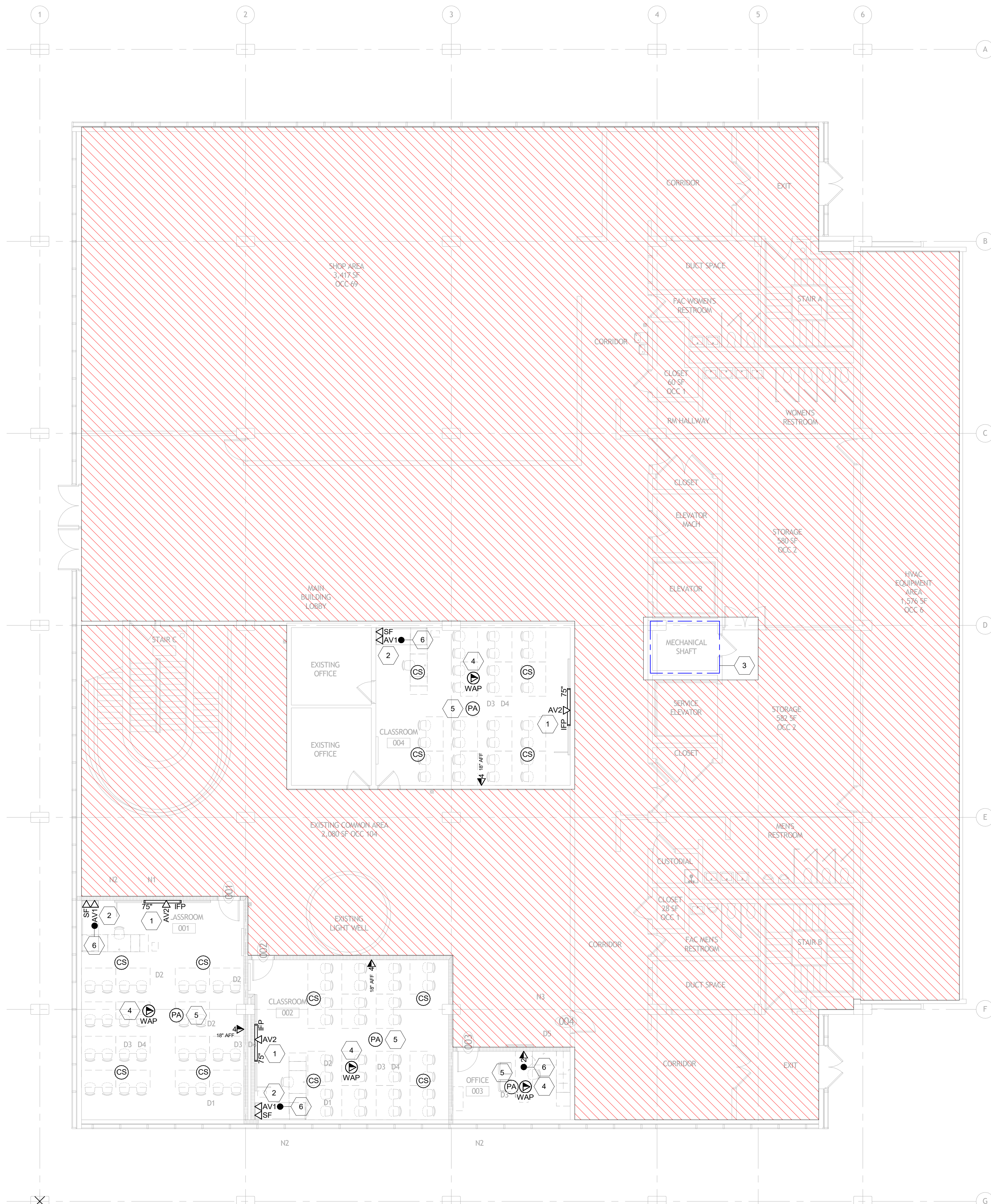
job number: **22019**

# GENERAL SHEET NOTES

A REFER TO SHEET T-002 FOR ALL GENERAL NOTES

# KEYED NOTES

- 1 CONTRACTOR TO PROVIDE 75" IFP DISPLAY. MOUNT DISPLAY SO THE BOTTOM OF THE DISPLAY IS 36" AFF. AV1 MOUNTED AT @ 54" AFF. COORDINATE LOCATION WITH DISPLAY MOUNT AND ELECTRICAL CONTRACTOR.
- 2 (SF) SOUND REINFORCEMENT AND (AV1) DATA WILL BE LOCATED IN COMMAND CABINET ON THE SIDE @ 18" AFF BESIDE EACH OTHER. CONTRACTOR TO PROVIDE LIGHTSPEED 975 WITH CORRESPONDING SPEAKERS. COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR.
- 3 (MDF) MAIN TECH ROOM LOCATED ON 2ND FLOOR ABOVE THE MECHANICAL SHAFT ROOM. ALL TECHNOLOGY CABLING TO BE ROUTED TO THE MDF ROOM LOCATED ON THE 2ND FLOOR.
- 4 CONTRACTOR TO PROVIDE WIRELESS ACCESS POINT. CISCO 9100MERA1 OR EQUAL. INTEGRATE NEW WIRELESS ACCESS POINT WITH EXISTING SYSTEM LOCATED IN THE MDF.
- 5 CONTRACTOR TO PROVIDE QUAM, BOGEN, OR EQUAL PAGING SPEAKERS. INTEGRATE NEW PAGING SPEAKERS WITH EXISTING SYSTEM LOCATED IN THE MDF.
- 6 CONTRACTOR TO PROVIDE POLYCOM VVX 201 HANDSETS. INTEGRATE NEW HANDSETS WITH EXISTING SYSTEM LOCATED IN THE MDF.

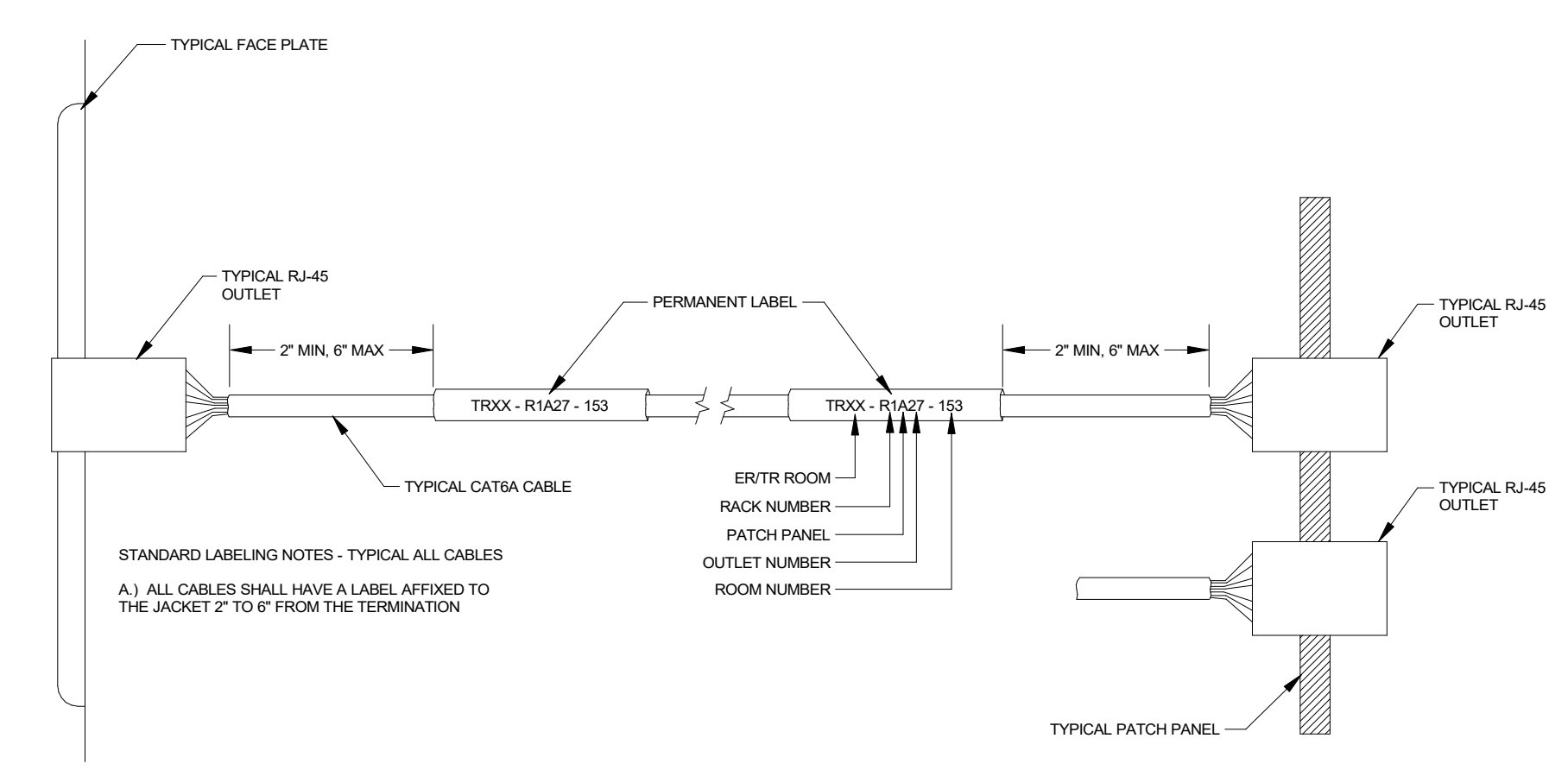
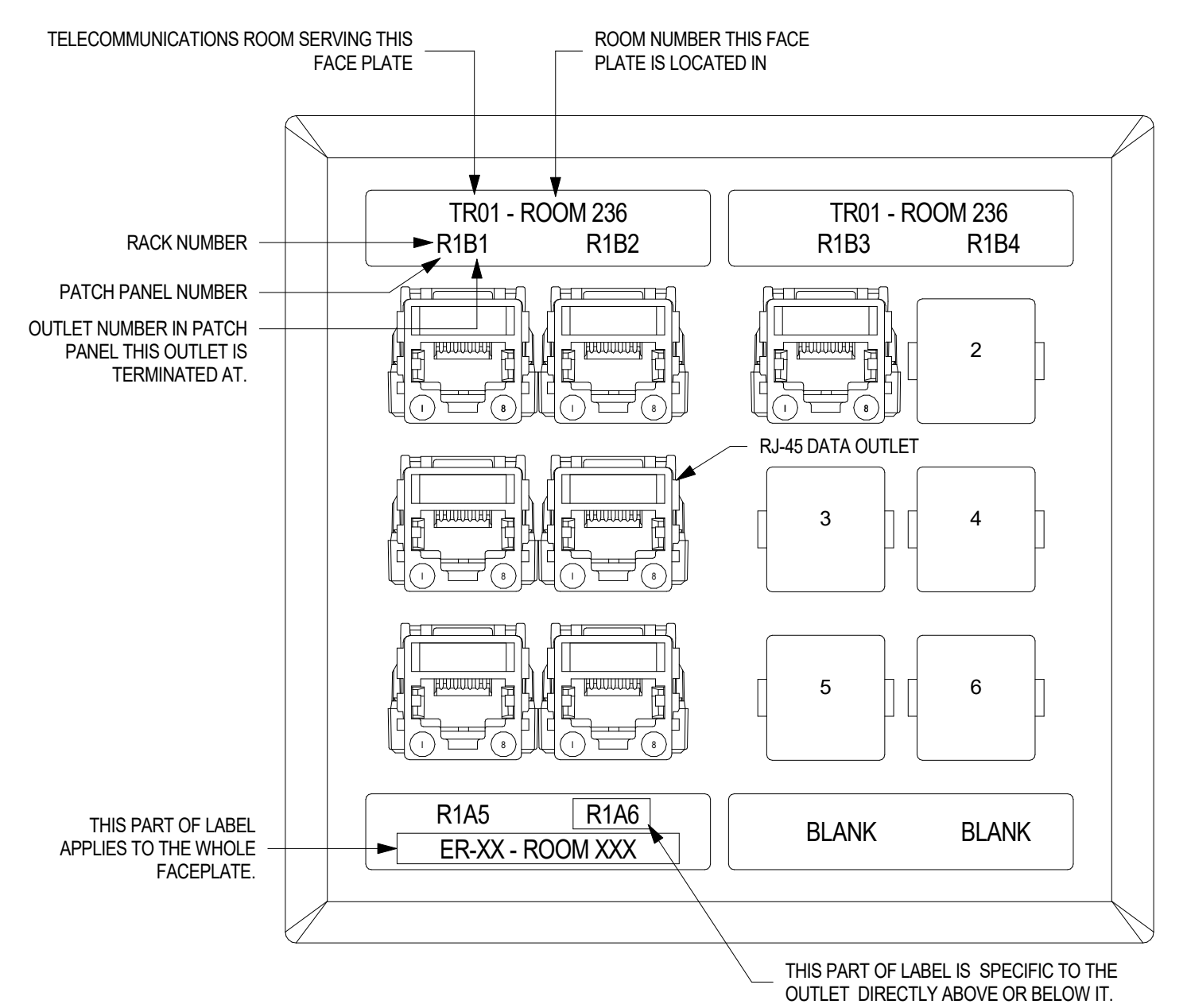


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sheet name:  
TECHNOLOGY FIRST FLOOR PLAN

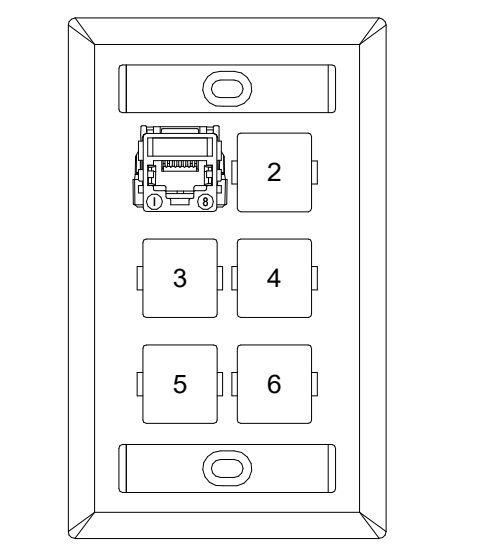
drawn by: CMD  
checked by: CB  
sheet number: T-101  
job number: 22019



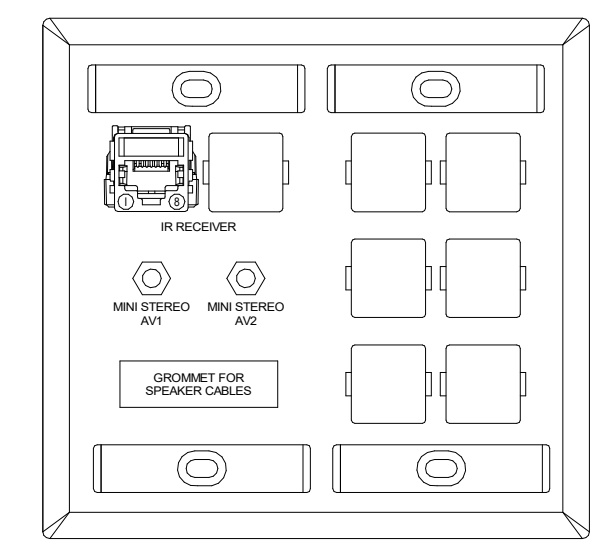
**VOICE/DATA OUTLET LABELING**

**1 FACEPLATE LABELING DETAIL**  
 NOT TO SCALE

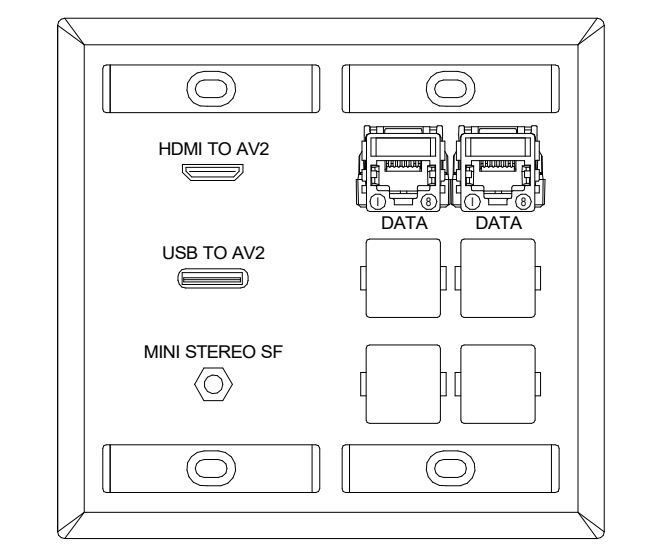
**2 TYPICAL CABLE LABELING AT OUTLET AND PATCH PANEL**  
 NOT TO SCALE



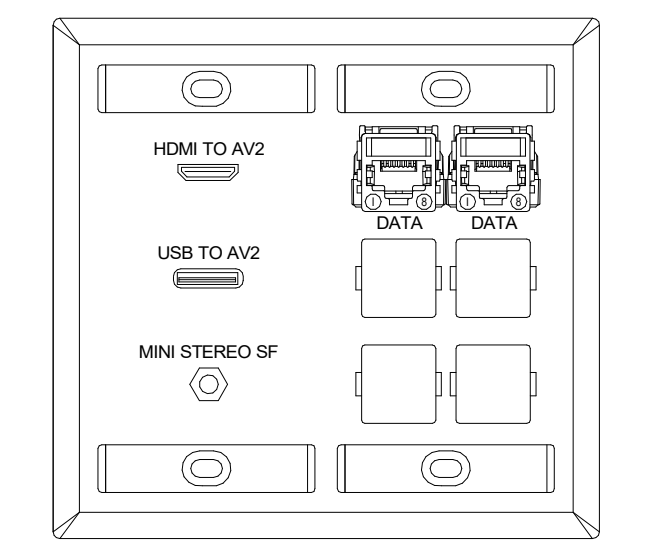
**3 DATA OUTLET DETAIL**  
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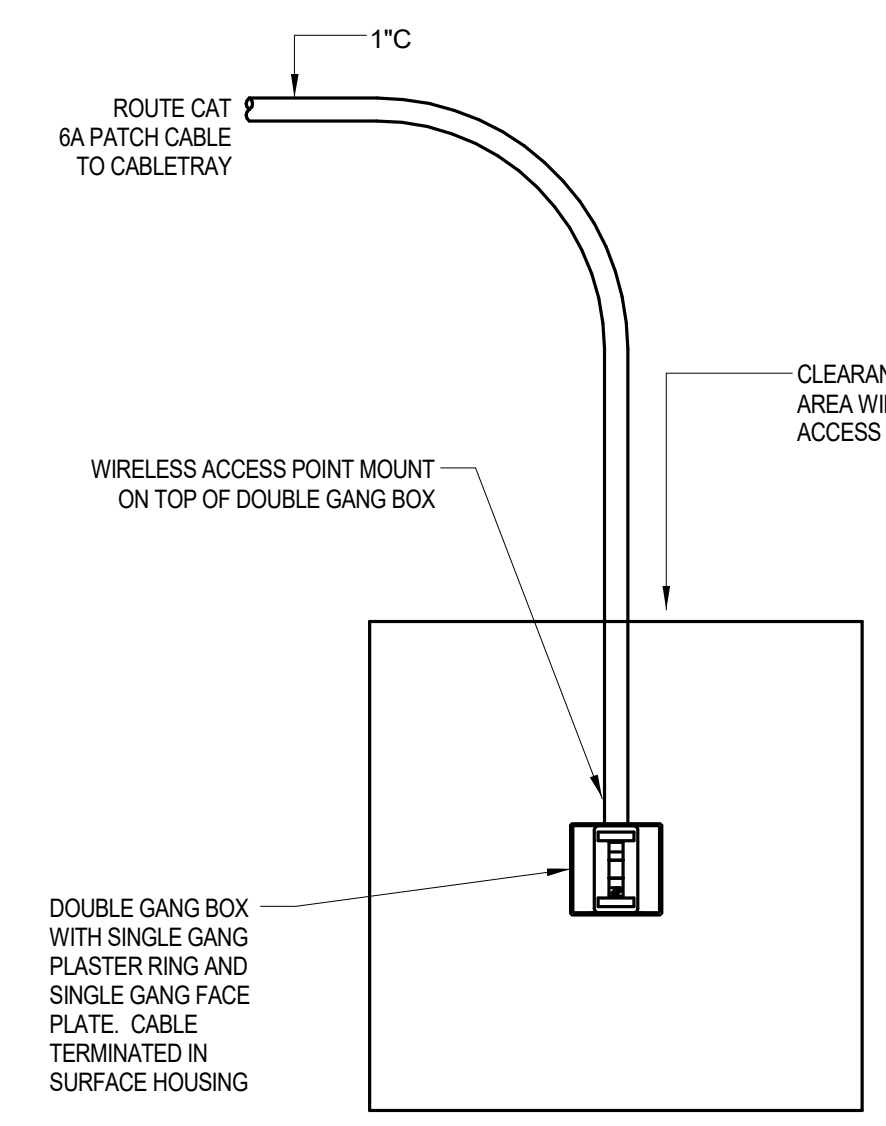
**4 SF AUDIO/VIDEO OUTLET DETAIL**  
 NOT TO SCALE



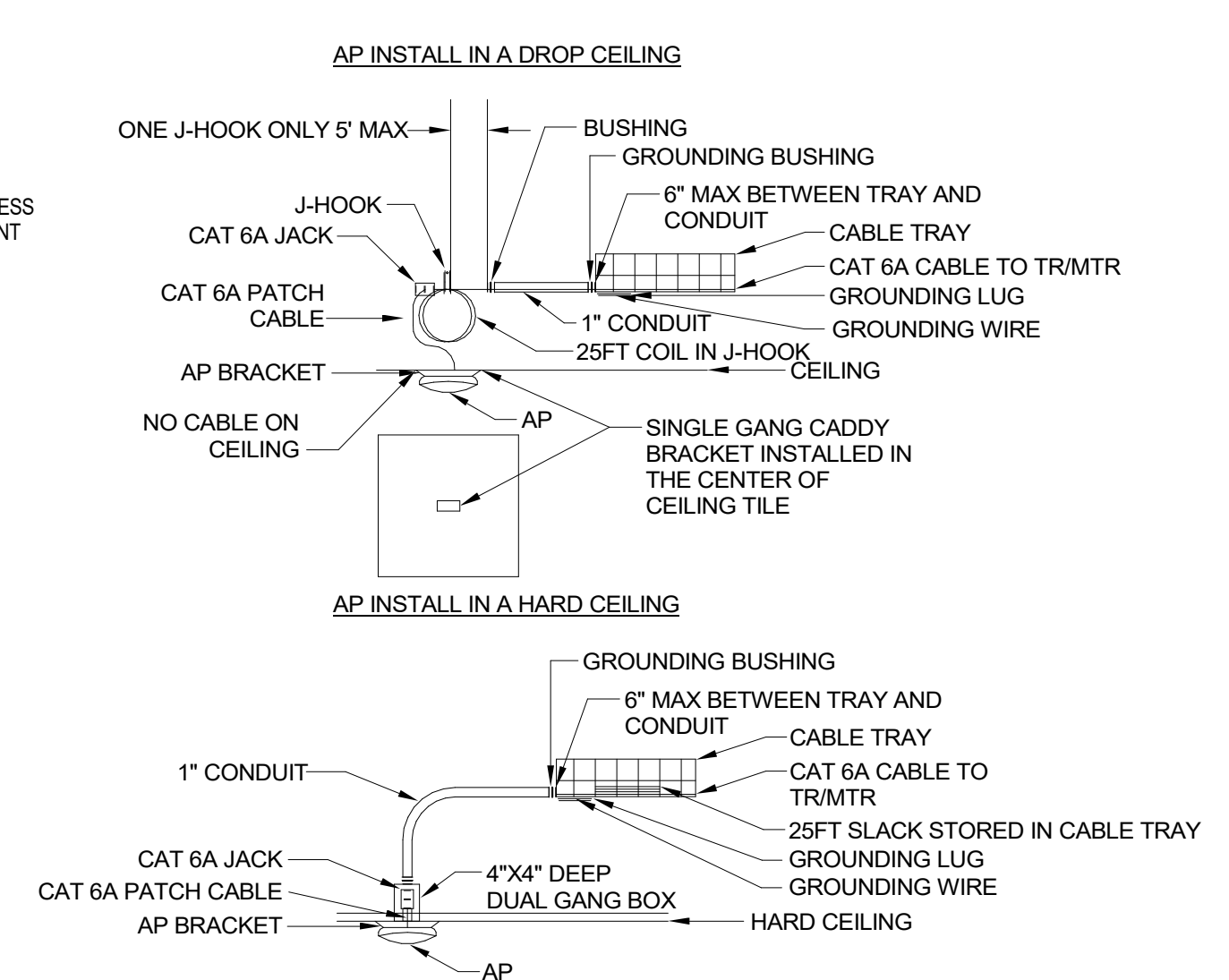
**5 AV1 DATA AV OUTLET DETAIL**  
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**6 AV2 DATA AV OUTLET DETAIL**  
 NOT TO SCALE



**7 WAP OUTLET DETAIL**  
 NOT TO SCALE



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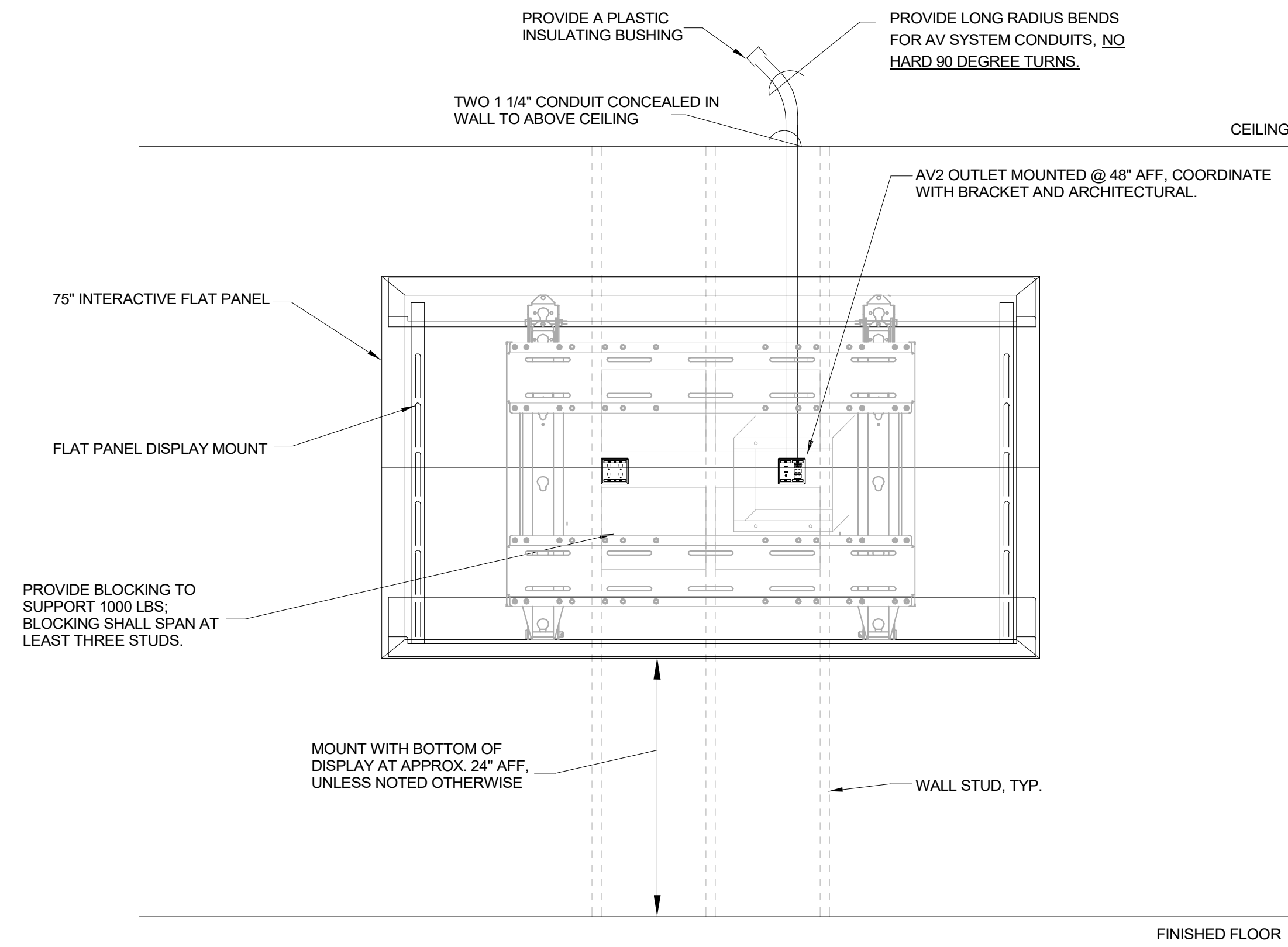
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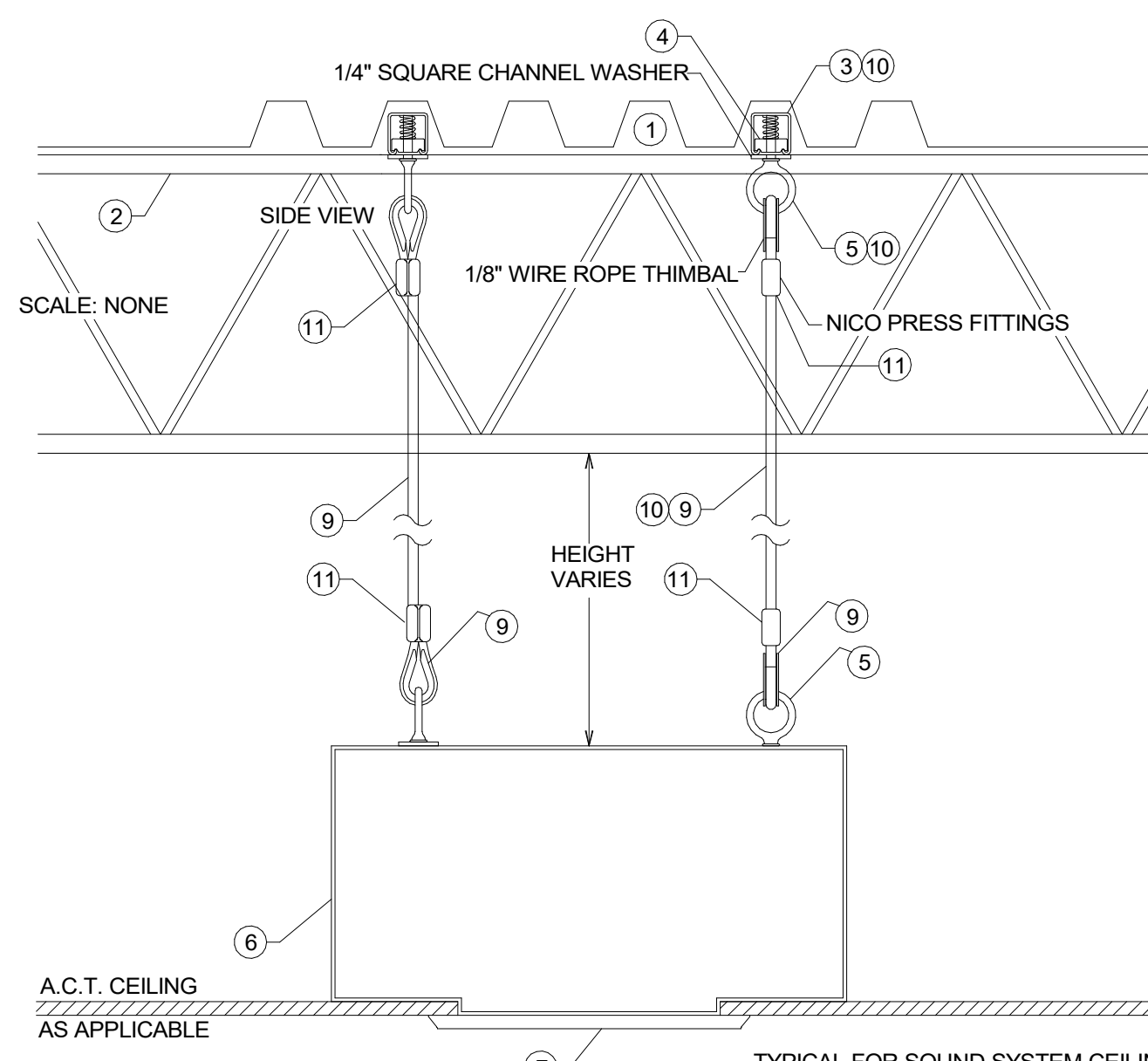
sheet name: TECHNOLOGY DETAILS (FACE PLATES)

drawn by: CMD  
 checked by: CB  
 sheet number: T-501  
 job number: 22019



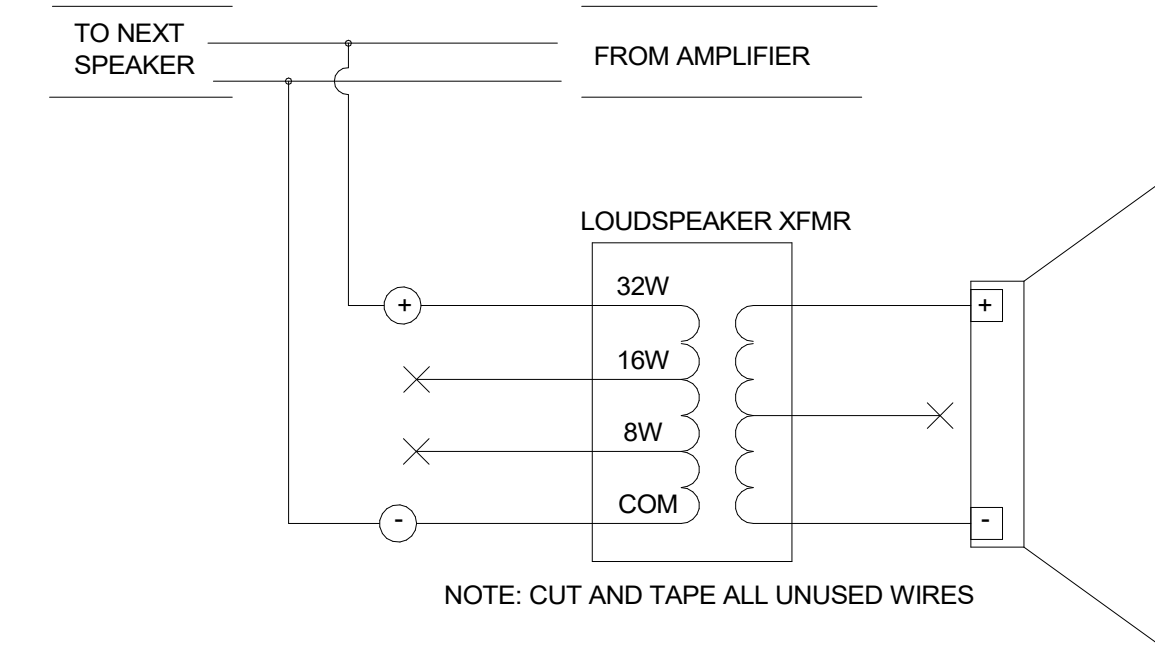


1 TYPICAL FLAT PANEL DETAIL  
NTS

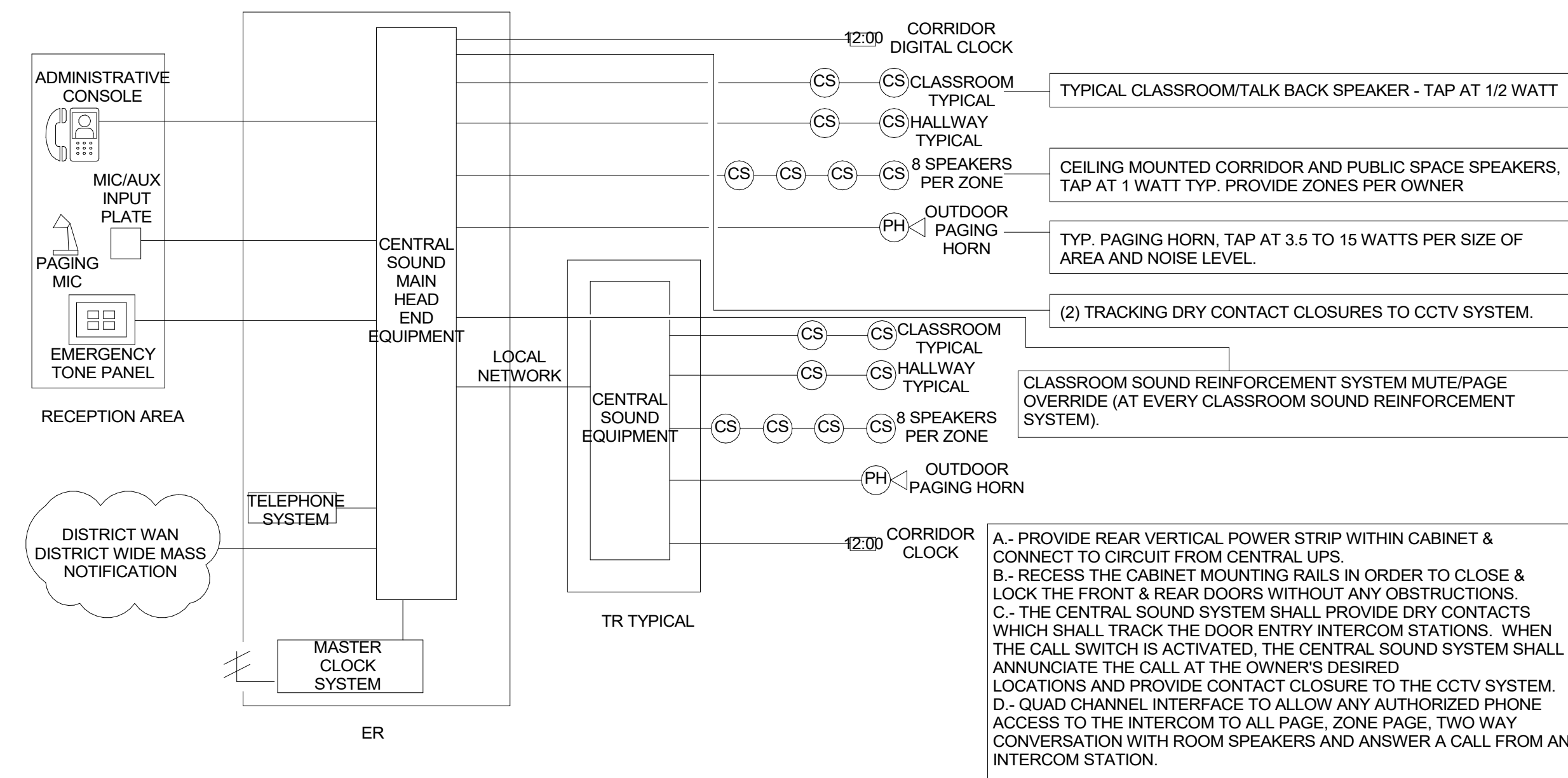


- GENERAL NOTES FOR ROUGH-IN DETAILS
- GROUT AROUND ALL PENETRATIONS OF MASONRY OR DRYWALL SURFACES SO THERE ARE NO GAPS BETWEEN CONDUIT AND/OR BACK BOXES AND WALL PENETRATIONS.
  - PULL STRING SHALL BE INSTALLED BETWEEN ALL PORTIONS OF THE BACK BOX AND CONDUIT RUN.
  - ALL CONDUIT CONNECTIONS TO BACK BOXES SHALL BE CONDUIT TO BOX CONNECTORS.
  - ALL CONDUITS SHALL BE RUN PARALLEL AND PERPENDICULAR TO BUILDING STRUCTURE.
- NOTES:
- METAL ROOF DECK
  - BAR JOIST
  - UNI-STRUT-SECURED TO DECK OR BAR JOIST
  - SPRING NUT
  - FORGED SHOULDER EYE BOLT
  - BACK CAN
  - GRILLE
  - TYPICAL SUSPENDED CEILING WHERE APPLICABLE
  - 1/8" GALVANIZED AIRCRAFT CABLE. DEAD HANG ANGLES SHALL NOT EXCEED 90 DEGREES FROM VERTICAL. ALL CABLE BENDS MUST USE THIMBLES TO MAINTAIN BEND RADIUS
  - ALL RIGGING HARDWARE INCLUDING UNI-STRUT AND BEAM CLAMPS SHALL HAVE AN 8:1 SAFETY FACTOR. NO CABLES OR CHAINS SHALL BE WRAPPED "CHOKER STYLE" AROUND BAR JOIST OR BEAMS WITHOUT USING PROPER SADDLES OR RADIUS GUIDES.
  - GRAPPLE STYLE SUPPORT DEVICES ARE EXPRESSLY FORBIDDEN.

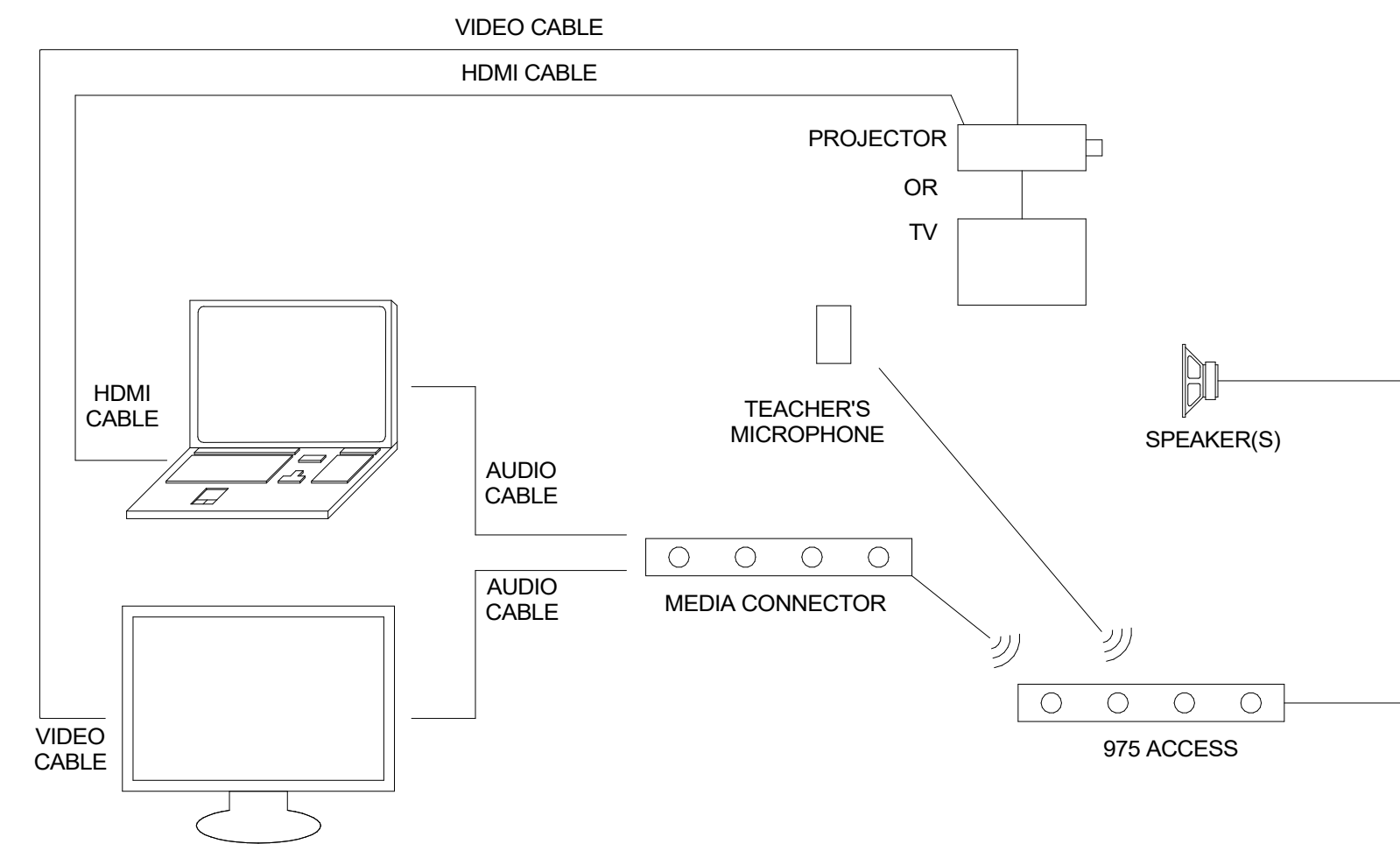
2 TYPICAL CEILING SOUND SYSTEM SPEAKER DETAIL  
NTS



3 LOUD SPEAKER TERMINATION  
NTS



4 CENTRAL SOUND SYSTEM SCHEMATIC DIAGRAM  
NTS



AV DIAGRAM NOTES:

- DIAGRAM IS REPRESENTATIONAL ONLY. AUDIO VISUAL INTEGRATOR SHALL SUBMIT FOR APPROVAL A PROJECT SPECIFIC RISER DIAGRAM. DIAGRAM SHALL INCLUDE, BUT NOT LIMITED TO, ALL REQUIRED DEVICES AND CABLING. SYSTEM SHALL BE INSTALLED PER APPROVED DIAGRAM AND MANUFACTURER'S RECOMMENDATIONS.
- ALL INSTALLATION MATERIALS AND WORKMANSHIP SHALL BE IN COMPLETE COMPLIANCE WITH ALL APPLICABLE CODES AND REGULATIONS INCLUDING, BUT NOT LIMITED TO, NFPA 70 (NEC) AS WELL AS ALL ASSOCIATED INDUSTRY STANDARDS, E.G. EIA/TIA 568.
- AUDIO VISUAL INTEGRATOR SHALL COORDINATE ALL POWER SUPPLY TERMINATIONS AND REQUIREMENTS WITH EC PRIOR TO INSTALLATION.
- AUDIO VISUAL INTEGRATOR SHALL PROVIDE ALL CABLING JUMPERS AND TERMINATIONS TO COMPLETE ALL INTERCONNECTIONS OF THE SYSTEM BOTH WITHIN, AND EXTERNAL TO, THIS SYSTEM. ALL NETWORK COPPER AND FIBER TERMINATIONS SHALL BE IN FULL COMPLIANCE WITH THE STRUCTURED CABLING SPECIFICATIONS AND SHALL MATCH SAME IN BOTH PERFORMANCE AND MANUFACTURER.

5 TYPICAL AV CONNECTIVITY DIAGRAM WITH SOUND REINFORCEMENT  
NTS

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