



**To: All Vendors Bidding on The College of New Jersey
Roscoe Student Services Renovation – Phase II**

**From: Lauren Manning
Finance & Business Services**

Date: November 28, 2023

ADDENDUM NO. 1

ISSUE DATE: December 5, 2023

REFERENCE: The College of New Jersey
Roscoe Student Services Renovation – Phase II
Bid No. AB240008

Date of Original Bidding Documents: November 20, 2023

INTENT: This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents and Prior Addenda if any, as identified above.

VENDOR QUESTIONS:

Question 1: Please provide the contact info for the existing Fire Alarm, Security & BMS Vendors for this location.

Response: All fire, security, and BMS systems are monitored and maintained by Honeywell. Our contact for Honeywell is Ed Mogck. His email is ed.mogck@honeywell.com and his phone number is 856-437-1847.

Question 2: Please provide the deck height.

Response: According to the as-built drawings, first-floor concrete deck to the top of the second-floor concrete waffle slab deck, the as-built drawings indicate a height 12'-3" (total thickness of the waffle slab is approximate 1'-3").

Question 3: Please provide a Material list of the AV system. The drawings do not show the part numbers of the AV devices used.

Response: The general contractor will only be responsible for the installation of framing, backing, conduit, and backboxes for all AV and IT components. TCNJ will be soliciting AV/IT vendors through an alternate bid to complete the AV/IT cabling, devices, equipment, and faceplate installations. A Telecommunications Responsibility Matrix has been included in the attached Revised Specifications for further clarification regarding the installation of AV & IT components.

CLARIFICATIONS:

Clarification #1: This bid is for only Phase II. This phase will focus primarily on the first floor, excluding the lobby and stairwells. Some work such as routing plumbing and electric may be run through the lower level or second floor as noted in the plans and specifications.

Clarification #2: Included in this Addendum are details for the installation of a temporary wall to enclose and secure the construction area from the building occupants. This wall will be installed through the lobby, that is noted as out of scope. The wall is must be included in the base bid.

END OF ADDENDUM NO. 1

**SECTION 000101
PROJECT TITLE PAGE**

**PROJECT MANUAL
FOR
THE COLLEGE OF NEW JERSEY
ROSCOE HALL STUDENT SERVICES RENOVATION**



**ARCHITECT'S PROJECT NUMBER: 22031600
2000 PENNINGTON ROAD, EWING, NJ 08618
DATE: 12-01-2023
ISSUED FOR: ADDENDUM #1
PREPARED BY: NORR**

END OF SECTION

**SECTION 000110
TABLE OF CONTENTS**

PROCUREMENT AND CONTRACTING REQUIREMENTS

1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

- A. 000101 - Project Title Page**
- B. 000110 - Table of Contents**

SPECIFICATIONS

2.01 DIVISION 01 -- GENERAL REQUIREMENTS

- A. 010100 - SUMMARY OF WORK**
- B. 010250 - MEASUREMENT AND PAYMENT
- C. 011000 - PROJECT PROCEDURES
- D. 013000 - SUBMITTALS AND SUBSTITUTIONS
- E. 013100 - QUALITY CONTROL
- F. 013200 - TEMPORARY FACILITIES
- G. 013220 - PHOTOGRAPHIC DOCUMENTATION
- H. 013300 - CONTRACT CLOSEOUT
- I. 013400 - PROJECT RECORD DOCUMENTS
- J. 015240 - CONSTRUCTION WASTE MANAGEMENT
- K. 014000 - Quality Requirements
- L. 017423 - Final Cleaning of Telecommunications Spaces**
- M. 017800 - Closeout Submittals

2.02 DIVISION 02 -- EXISTING CONDITIONS

- A. 024100 - Demolition

2.03 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

- A. 061000 - Rough Carpentry
- B. 062000 - Finish Carpentry
- C. 064100 - Architectural Wood Casework
- D. 066100 - Cast Polymer Fabrications

2.04 DIVISION 08 -- OPENINGS

- A. 081116 - Aluminum Doors and Frames
- B. 081213 - Hollow Metal Frames
- C. 081416 - Flush Wood Doors
- D. 087100 - Door Hardware
- E. 088000 - Glazing

2.05 DIVISION 09 -- FINISHES

- A. 090561 - Common Work Results for Flooring Preparation
- B. 092116 - Gypsum Board Assemblies
- C. 092216 - Non-Structural Metal Framing
- D. 095100 - Acoustical Ceilings
- E. 096500 - Resilient Flooring
- F. 096813 - Tile Carpeting
- G. 099123 - Interior Painting

2.06 DIVISION 10 -- SPECIALTIES

2.07 DIVISION 21 -- FIRE SUPPRESSION

- A. 210500 - Common Work Results for Fire Suppression
- B. 210553 - Identification for Fire Suppression Piping and Equipment
- C. 211300 - Fire-Suppression Sprinkler Systems

2.08 DIVISION 22 -- PLUMBING

- A. 220523 - General-Duty Valves for Plumbing Piping
- B. 220529 - Hangers and Supports for Plumbing Piping and Equipment
- C. 220719 - Plumbing Piping Insulation
- D. 221005 - Plumbing Piping
- E. 224000 - Plumbing Fixtures

2.09 DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

- A. 230513 - Common Motor Requirements for HVAC Equipment
- B. 230519 - Meters and Gauges for HVAC Piping
- C. 230523 - General-Duty Valves for HVAC Piping
- D. 230529 - Hangers and Supports for HVAC Piping and Equipment
- E. 230553 - Identification for HVAC Piping and Equipment
- F. 230593 - Testing, Adjusting, and Balancing for HVAC
- G. 230719 - HVAC Piping Insulation
- H. 230913 - Instrumentation and Control Devices for HVAC
- I. 230923 - Direct-Digital Control System for HVAC
- J. 232113 - Hydronic Piping
- K. 232213 - Steam and Condensate Heating Piping
- L. 232214 - Steam and Condensate Heating Specialties
- M. 233100 - HVAC Ducts and Casings
- N. 233300 - Air Duct Accessories
- O. 233416 - Centrifugal HVAC Fans
- P. 233600 - Air Terminal Units
- Q. 233700 - Air Outlets and Inlets
- R. 237313 - Modular Indoor Central-Station Air-Handling Units

2.10 DIVISION 25 -- INTEGRATED AUTOMATION

2.11 DIVISION 26 -- ELECTRICAL

- A. 260519 - Low-Voltage Electrical Power Conductors and Cables
- B. 260526 - Grounding and Bonding for Electrical Systems
- C. 260529 - Hangers and Supports for Electrical Systems
- D. 260533.13 - Conduit for Electrical Systems
- E. 260533.16 - Boxes for Electrical Systems
- F. 260553 - Identification for Electrical Systems
- G. 260583 - Wiring Connections
- H. 260923 - Lighting Control Devices
- I. 262416 - Panelboards

- J. 262726 - Wiring Devices
- K. 262813 - Fuses
- L. 262816.13 - Enclosed Circuit Breakers
- M. 262816.16 - Enclosed Switches
- N. 265100 - Interior Lighting

2.12 DIVISION 27 -- COMMUNICATIONS

- A. 270505 - SELECTIVE DEMOLITION OF COMMUNICATIONS
- B. 270526 - GROUNDING AND BONDING FOR COMMUNICAITONS SYSTEMS**
- C. 270533 - CONDUITS AND BACKBOXES FOR COMMUNICAITONS SYSTEMS**
- D. 270553 - IDENTIFICATION FOR COMMUNICAITONS SYSTEMS
- E. 270800 - COMMISSIONING OF COMMUNICAITONS**
- F. 271116 - COMMUNICAITONS CABINETS, RACKS, FRAMES AND ENCLOSURES
- G. 271123 - COMMUNICATIONS CABLE MANAGEMENT AND LADDER RACK
- H. 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING**
- I. 274116 - INTEGRATED AUDIOVISUAL SYSTEMS**

2.13 DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

- A. 284600 - Fire Detection and Alarm

END OF SECTION

**SECTION 010100
SUMMARY OF WORK**

PART 1- GENERAL

1.01 RELATED DOCUMENTS

DRAWINGS AND GENERAL PROVISIONS OF THE SPECIFICATIONS, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND OTHER DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. THE PROJECT CONSISTS OF ALL WORK NOTED ON THE DRAWINGS AND IN THESE SPECIFICATIONS. WORK INDICATED AS "PHASE 1" ON DRAWINGS SHOULD BE EXCLUDED FROM BID AT THIS TIME.

1. PROJECT LOCATION: THE COLLEGE OF NEW JERSEY, EWING NEW JERSEY

2. OWNER: THE COLLEGE OF NEW JERSEY, STATE OF NEW JERSEY

1.03 CONTRACTS

A. THE PROJECT CONTRACT IS BETWEEN THE COLLEGE OF NEW JERSEY AND THE SINGLE PRIME CONTRACTOR PERFORMING THE WORK SPECIFIED.

B. DEFINITION OF EXTENT OF CONTRACT WORK: THE CONTRACT DOCUMENTS, SPECIFICATIONS, PROJECT DRAWINGS, MANUFACTURER'S INSTALLATION HANDBOOKS, TCNJ FORM OF AGREEMENT, AND THE CONTRACTORS RESPONSE TO THE RFP REPRESENT THE EXTENT OF THE CONSTRUCTION CONTRACT.

1.04 CONTRACTORS USE OF PREMISES

A. GENERAL: DURING THE CONSTRUCTION PERIOD THE CONTRACTOR SHALL HAVE FULL USE OF THE PREMISES FOR CONSTRUCTION OPERATIONS, INCLUDING USE OF THE SITE. THE CONTRACTOR'S USE OF THE PREMISES IS LIMITED ONLY BY THE OWNER'S RIGHT TO PERFORM WORK, RETAIN OTHER CONTRACTORS ON PORTIONS OF ASSOCIATED PROJECTS, OR TO ACCESS THE BUILDING FOR THE OCCUPANTS.

1. CONTRACTOR IS TO COORDINATE THEIR WORK WITH THE ACTIVITIES FOR EACH WORK LOCATION.

B. USE OF THE SITE: LIMIT USE OF THE PREMISES TO AREAS REQUIRED FOR EQUIPMENT AND MATERIAL STORAGE AND ACCESS TO THE ROOF AREA. CONFINE OPERATIONS TO AREAS WITHIN CONTRACT LIMITS INDICATED. DO NOT DISTURB PORTIONS OF THE SITE BEYOND THE AREAS IMMEDIATELY ADJACENT TO THE BUILDING WHERE THE WORK IS BEING PERFORMED.

1. OWNER OCCUPANCY: ALLOW FOR OWNER OCCUPANCY AND USE BY THE PUBLIC.

2. DRIVEWAYS AND ENTRANCES: KEEP DRIVEWAYS AND ENTRANCES SERVING THE PREMISES CLEAR AND AVAILABLE TO THE OWNER, THE OWNER'S EMPLOYEES, AND EMERGENCY VEHICLES AT ALL TIMES. DO NOT USE THESE AREAS FOR PARKING OR STORAGE OF MATERIALS UNLESS PREVIOUSLY APPROVED BY THE OWNER. SCHEDULE DELIVERIES TO MINIMIZE SPACE AND TIME REQUIREMENTS OR STORAGE OF MATERIALS AND EQUIPMENT ON -SITE.

3. BURIAL OF WASTE MATERIALS: DISPOSAL OF ORGANIC AND HAZARDOUS MATERIALS ON-SITE EITHER BY BURIAL OR BURNING, WILL NOT BE PERMITTED.

4. PARKING IS ALLOWED WITH IN THE CONSTRUCTION FENCE ONLY. IF MORE PARKING IS NEEDED, THERE IS ADDITIONAL PARKING PROVIDED AT THE COLLEGES CARLTON AVENUE PARKING LOT. THE CONTRACTOR IS RESPONSIBLE TO SHUTTLE WORKERS BACK AND FORTH AS NEEDED.

C. USE OF THE EXISTING BUILDING: MAINTAIN ANY EXISTING BUILDING IN A WEATHERTIGHT CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. REPAIR DAMAGE CAUSED BY CONSTRUCTION OPERATIONS. TAKE ALL PRECAUTIONS NECESSARY TO PROTECT THE BUILDING, ITS CONTENTS, COMPONENTS, AND SYSTEMS AND ITS OCCUPANTS DURING THE CONSTRUCTION PERIOD.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3- EXECUTION

1. SEE EXHIBIT (NEXT PAGE) FOR TELECOMMUNICATIONS RESPONSIBILITY MATRIX.

ENDOF SECTION

SECTION 017423.05 DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Final cleaning of telecommunication spaces before installation of IT Equipment

1.02 REFERENCES

- A. Abbreviation and Acronyms
 - 1. IT Information Technology
 - 2. HEPA High-Efficiency Particulate Air

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination
 - 1. Liaise with the Owner three (3) weeks before the IT equipment installation date and complete cleaning, including any rework for non-conforming cleaning three (3) days before IT equipment installation date.
- B. Scheduling
- C. Notification
 - 1. Notify the Contract Administrator:
 - a. Where the document references unavailable sections
 - b. Where conflicts arise from requests in the documentation, implement the most onerous provision.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces
- B. Use only materials as recommended by the manufacturer of the surface being cleaned.
- C. Vacuum
 - 1. HEPA filter

2.02 SOURCE QUALITY-CONTROL

- A. Tests and Inspections
 - 1. Visual inspection of cleanliness.
 - a. Run white cloth along the surface and inspect.
 - b. The cloth should not show any discoloration.
 - c. Perform on various surfaces at high and low level.
- B. Nonconforming Work
 - 1. Rework.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions
 - 1. Check actual site conditions before starting any Work.
 - 2. Ensure all preceding Work associated with the telecommunications system is accurate and complete before proceeding with the cleaning.

3.02 PREPARATION

- A. Protection of In-Place Conditions
 - 1. Install dust mat to the exterior and interior of the space.
 - 2. Construct dust containment barrier to exterior of the space.

- B. Surface preparation
 - 1. Remove any debris or dust that may dislodge in the future during maintenance or installation of new cables.
- C. Demolition/Removal
 - 1. Remove all debris.

3.03 CLEANING

- A. Perform a broom clean.
- B. Vacuum floor and all surfaces
 - 1. Start from the top and work down and out toward the space's exit.
 - 2. Remove larger, loose dust and dirt.
- C. Damp wipe walls, ceiling and floors from top to bottom to remove attached dust and debris.
- D. Damp wipe ductwork.
- E. Use a non-damp anti-static cloth to clean cabinets, racks, shelves, patch panels, cables, and containment.
- F. Clean as recommended by Manufacturer.
 - 1. Do not use materials or methods which may damage the surface or surrounding construction.
- G. Waste Management: Recycle all detritus.

3.04 SITE QUALITY-CONTROL

- A. Site Tests and Inspections
 - 1. Perform visual inspection at least three (3) days before installation of equipment.
- B. Nonconforming Work: Complete cleaning three (3) days before installation of equipment.

3.05 PROTECTION

- A. Protect the space from any adjacent activities which may introduce dust or debris into the space.

END OF SECTION

SECTION 270526
GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: a uniform telecommunication grounding (earthing) and bonding infrastructure and its interconnection to other building systems.
 - 1. Busbars
 - 2. Grounding and bonding connectors
 - 3. Ground lugs
- B. Related Requirements.
 - 1. Section 27 05 33 Conduits and Backboxes for Communications Systems
 - 2. Section 27 15 13 Communications Copper Horizontal Cabling

1.02 REFERENCES

- A. Abbreviation and Acronyms
 - 1. ANSI American National Standards Institute
 - 2. AWG American Wire Gauge
 - 3. BICSI Building Industry Consulting Services International
 - 4. DC Direct Current
 - 5. EIA Electronics Industries Alliance
 - 6. GE Grounding Equalizer
 - 7. ISO International Organization for Standardization
 - 8. IEEE Institute of Electrical and Electronics Engineers
 - 9. NECA We Are the National Electrical Contractors Association
 - 10. NEMA National Electrical Manufacturers Association
 - 11. NFPA National Fire Protection Association
 - 12. NRTL Nationally Recognized Testing Laboratory
 - 13. PMP Project Management Professional
 - 14. RCDD Registered Communications Distribution Designer
 - 15. RTPM Registered Telecommunications Project Manager
 - 16. TAA Trade Agreements Act
 - 17. TECH Technician
 - 18. TIA Telecommunications Industry Association
 - 19. TGB Telecommunications Grounding Busbar
 - 20. TMGB Telecommunications Main Grounding Busbar
 - 21. UL Underwriters Laboratory, an NRTL
- B. Reference Standards
 - 1. ANSI/BICSI/NECA-607 – Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings, 2011
 - 2. ANSI/NECA/BICSI 568-2006 – Standard for Installing Commercial Building Telecommunications Cabling
 - 3. ANSI/TIA-607-C – Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises, 2015
 - 4. BICSI Information Transport Systems Installation Methods Manual (ITSIMM) 7th Edition
 - 5. BICSI Telecommunications Methods Manual (TDMM) 13th Edition
 - 6. IEEE 81-2012 – IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
 - 7. NECA 1-2015: Standard for Good Workmanship in Electrical Construction
 - 8. NEMA VE 2 – Cable Tray Installation Guidelines, 2013
 - 9. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination
 - 1. Install and coordinate the Work in cooperation with interrelated Work.
- B. Scheduling
 - 1. Review the Contract Documents and the overall construction schedule to determine all interfacing and timing of the Work.
- C. Notification
 - 1. Notify the Contract Administrator:
 - a. Where the document references sections that are unavailable.
 - b. Where conflicts arise from requests in the documentation, request clarification from the Consultant through the project's RFI process.

1.04 ACTION SUBMITTALS

- A. General: Submit per Division 01, Section 01 33 00
- B. Product Data: Manufacturer's technical literature for each product indicated, specified or required; include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings:
 - 1. Provide schematic drawings of the complete grounding system identifying all connection points.
 - 2. Include the the location of system ground electrode connections and the routing of above-ground and underground electrode conductors.
- D. Samples: Submit a sample for each component.
- E. Special Procedure Submittals
 - 1. Deliver-in-time installation strategy.
- F. Qualification Statements
 - 1. Project Manager
 - a. Provide a statement for Project Manager who should possess a Registered Communications Distribution Designer qualification, be in good standing with BICSI, and has demonstrable experience managing similar projects in size and scope to this project.

1.05 CLOSEOUT SUBMITTALS

- A. Maintenance Contracts: For each product
- B. Operation and Maintenance Data: For each product
- C. Warranty Documentation: For the system
- D. Record Documentation
 - 1. Record drawings indicating the location of all components and component identification.
 - 2. Test reports indicating the resistance to ground at each busbar.

1.06 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals
 - 1. Restriction of Hazardous Substances Directive compliant
- B. Qualifications
 - 1. Manufacturers:
 - a. ISO 9001 – Quality Management Certification
 - b. ISO 14001 – Environmental Management Certification
 - c. All components of the grounding and bonding system shall be from the same Manufacturer.
 - 2. Suppliers
 - a. Manufacturer's Approved Status

3. Installers
 - a. Site supervisor:
 - (a) BICSI Technician (TECH)
 - b. Project Manager
 - 1) BICSI Registered Communications Distribution Designer (RCDD)
 - 2) Project management certification, one of the following at minimum:
 - (a) Project Management Professional (PMP)
 - (b) BICSI Registered Telecommunications Project Manager (RTPM)
 - (c) Manager (RTPM)

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 1. Deliver in manufacturer's original unopened and undamaged packages with manufacturer's labels legible and intact.
 - a. Except if removing packaging offsite to reduce waste as part of a documented deliver-in-time installation strategy.
 2. Inspect manufacturer's packages upon receipt.
- B. Storage and Handling Requirements: Protect from moisture, falls and compaction.
- C. Packaging Waste Management: Recycle all materials.

1.08 SITE CONDITIONS

- A. Ambient Conditions: Do not conduct the test to report for completeness of the system until the electrical power for the entire site is live and operational.

1.09 WARRANTY

- A. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Manufacturer List
 - a. Chatsworth Products, Inc.
 - b. CommScope, Inc.
 - c. Ortronics by Legrand North America, LLC.
 - d. Harger
 2. Substitution Limitations: Submit substitution request in accordance with Section 01 25 00 – Substitution Procedures.
- B. Description
 1. Regulatory Requirements
 - a. UL Listed for Grounding and Bonding Equipment (UL 467).
 - b. Trade Agreements Act (TAA) Compliant.
- C. Performance/Design Criteria
 1. Capacities
 - a. Primary Bonding Busbar (PBB) formerly Telecommunications Main Grounding Busbar (TMGB)
 - 1) Pre-drilled copper busbar with holes to accommodate standard sized lugs.
 - 2) Minimum dimensions: 6 mm (0.25 in.) thick x 100 mm (4 in.) high x 510 mm (20 in.) long.
 - 3) Hole pattern to accommodate two-hole lugs per the recommendation of NECA/BICSI 607-2011 and TIA-607-B.
 - 4) Accommodate grounding lugs of 8 mm (5/16 in.) diameter with 16 mm (5/8 in.) hole centers and 11 mm (7/16 in.) diameter with 25 mm (1 in.) hole centers.

- 5) Have wall-mount stand-off brackets, assembly screws and insulators creating a 50 mm (2 in.) separation from the wall.
- b. Secondary Bonding Busbar formerly Telecommunications Grounding Busbar (TGB)
 - 1) Pre-drilled copper busbar with holes to accommodate standard sized lugs.
 - 2) Minimum dimensions: 6 mm (0.25 in.) thick x 50 mm (2 in.) high x 300 mm (20 in.) long.
 - 3) Have one row with nine (9) attachment points for two-hole grounding lugs.
 - 4) Hole pattern to accommodate two-hole lugs per the recommendation of NECA/BICSI 607-2011 and TIA-607-B.
 - 5) Accommodate grounding lugs of 8 mm (5/16 in.) diameter with 16 mm (5/8 in.) hole centers and 11 mm (7/16 in.) diameter with 25 mm (1 in.) hole centers.
 - 6) Have wall-mount stand-off brackets, assembly screws and insulators creating a 50 mm (2 in.) separation from the wall.
- c. Bonding Conductors
 - 1) Copper
 - 2) When insulated, listed for the application.
 - 3) Sized at 6.5 kcmil/m (2 kcmil/ft) of conductor length.
 - (a) TBB and TBC to be minimum #4/0.
 - 4) Minimum bonding conductor size shall be 6 AWG.
 - 5) Size bonding conductors per Figure 5.4.4.1 of TIA-607.
 - 6) The bonding conductor insulation shall be green. If not insulated, permanently marked with green color.
- d. Bonding Accessories
 - 1) Two Mounting Hole Ground Terminal Block
 - (a) Electroplated tin aluminum extrusion.
 - (b) Accept conductors ranging from 14 AWG through 2 AWG.
 - (c) The conductors shall be held in place by two stainless steel set screws.
 - (d) Have two 6.4 mm (1/4 in.) holes spaced on 15.8 mm (5/8 in.) centers to allow secure two-bolt attachment to the rack or cabinet.
 - (e) Ground terminal block shall be UL Listed as a wire connector.
 - 2) Compression Lugs
 - (a) Electroplated tinned copper.
 - (b) Have two holes spaced on 15.8 mm (5/8 in.) or 25.4 mm (1 in.) centers, as stated below, to allow secure two-bolt connections to busbars.
 - (c) Sized to fit a specific size conductor, sizes 6 AWG to 4 AWG.
 - (d) Compression lugs shall be UL Listed as wire connectors.
 - 3) Antioxidant Joint Compound
 - (a) Oxide inhibiting joint compound for copper-to-copper, aluminum-to-aluminum or aluminum-to-copper connections.
 - (b) Equipment Ground Jumper.
 - (c) 300 mm (24 in.) L insulated ground jumper with a straight two-hole .compression lug on one end and an L-shaped two-hole compression lug on the other end.
 - (d) Ground conductor is an insulated green/yellow stripe 6 AWG wire.
 - (e) Lugs made from electroplated tinned copper and have two mounting holes spaces 13 mm (0.5 in.) to 16 mm (0.625 in.) apart that accept 6 mm (1/4 in.) screws.
 - (f) UL Listed.
 - 4) Accessory Products:
 - (a) Provide any accessory products related to the copper connectors required to provide a complete and functional infrastructure system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions
 - 1. Check actual site conditions before starting any Work.
 - 2. Ensure all preceding Work associated with the telecommunications system is accurate and complete before proceeding with the installation or use of products specified in this section.

3.02 INSTALLATION

- A. Install as per:
 - 1. The manufacturer's recommended installation instructions
 - 2. ANSI/NECA/BICSI 568-2006
 - 3. ANSI/BICSI/NECA-607
 - 4. BICSI ITSIMM
 - 5. NECA-1
 - 6. NFPA 70
- B. Wall-Mount Busbars
 - 1. Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions.
 - 2. Make conductor connections to the TMGB or TGB with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
 - 3. Attach each lug with stainless steel hardware after preparing the bond according to the manufacturer's recommendations and treating the bonding surface on the busbar with an antioxidant joint compound to help prevent corrosion at the bond.
- C. Rack-Mount Busbars and Ground Bars
 - 1. Add a rack-mount horizontal or vertical busbar or ground bar to each rack or cabinet.
 - 2. Attach rack-mount busbars and ground bars to racks or cabinets according to the manufacturer's installation instructions.
 - 3. Bond the rack-mount busbar or ground bar to the room's TMGB or TGB with appropriately sized hardware and conductor.
- D. Ground Terminal Block
 - 1. Bond every rack and cabinet to the TMGB or TGB.
 - 2. Make the minimum bonding connection to racks and cabinets with a rack-mount two-hole ground terminal block sized to fit the conductor and rack and installed according to manufacturer recommendations.
 - 3. Remove paint between rack/cabinet and terminal block, clean surface and use antioxidant between the rack and the terminal block to help prevent corrosion at the bond.
- E. Pedestal Clamp
 - 1. Bond every sixth raised access floor pedestal with a minimum 6 AWG conductor to the TMGB or TGB using a pedestal clamp sized to fit the pedestal and the conductor and installed according to the manufacturer's recommendations.
 - 2. If pedestal clamps are used to construct a signal reference grid, bond the signal reference grid to the TMGB or TGB and bond each rack and cabinet to the signal reference grid using a compression tap or similar non-reversible bonding component sized to fit both conductors.
 - 3. Remove paint between the pedestal and pedestal clamp, clean surface and use antioxidant between the pedestal and the clamp to help prevent corrosion at the bond.
 - 4. Remove insulation from conductors where wires attach to the pedestal clamp.
- F. Equipment Ground Jumper Kit
 - 1. Bond equipment to a vertical rack-mount busbar or ground bar using ground jumper according to the manufacturer's recommendations.
 - 2. Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount busbar or ground bar to help prevent corrosion at the bond.

3.03 REINSTALLATION

- A. No additional burden to the Owner regarding costs, network downtime, or end-user interruption shall result from the reinstallation of specified components.
- B. Coordinate any reinstallation work, in writing, with the Owner.

3.04 SITE QUALITY CONTROL

- A. Site Tests and Inspections: Test the resistance to ground at each busbar to certify performance of the grounding and bonding system.
 - 1. Verify that the grounding system resistance to ground does not exceed 5 ohms.
 - 2. Measure using a four-terminal fall-of-potential method as defined in IEEE 81.
 - 3. Measure with an un-energized electrical distribution system in normally dry conditions not less than 48 hours after the last rainfall.
 - 4. Measure with an energized electrical distribution system in normally dry conditions not less than 48 hours after the last rainfall.
- B. Nonconforming Work: Reinstall.

3.05 CLEANING

- A. Clean as recommended by Manufacturer. Do not use materials or methods which may damage the surface or surrounding construction.
- B. Waste Management: Recycle all detritus.

3.06 PROTECTION

- A. Protect the grounding and bonding system from subsequent construction operations.

END OF SECTION

SECTION 270533
CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Conduit, fittings and bodies, including multi-cell conduit.
 - 2. Junction boxes, pull boxes and gutters.
 - 3. Measured pull tape.
- B. Related Requirements
 - 1. Section 27 05 26 Grounding and Bonding for Communication Systems
 - 2. Section 27 15 13 Communications Copper Horizontal Cabling

1.02 REFERENCES

- A. Abbreviation and Acronyms
 - 1. AFF Above Finish Floor
 - 2. ANSI American National Standards Institute
 - 3. BICSI Building Industry Consulting Services International
 - 4. EMT Electric Metallic Tubing
 - 5. ENT Electrical Nonmetallic Tubing
 - 6. ID Inside Diameter
 - 7. ISO International Organization for Standardization
 - 8. NEC NEC Corporation of America
 - 9. NECA National Electrical Contractors Association
 - 10. NEMA National Electrical Manufacturers Association
 - 11. NFPA National Fire Protection Association
 - 12. NRTL Nationally Recognized Testing Laboratory
 - 13. OD Overall Diameter
 - 14. PVC Polyvinyl Chloride
 - 15. PMP Project Management Professional
 - 16. RCDD Registered Communications Distribution Designer
 - 17. RTPM Registered Telecommunications Project Manager
 - 18. TAA Trade Agreements Act
 - 19. TDMM Telecommunications Distribution Methods Manual
 - 20. TIA Telecommunications Industry Association
 - 21. UL Underwriters Laboratory, an NRTL
- B. Reference Standards
 - 1. ANSI/NECA/BICSI 568-2006 – Standard for Installing Commercial Building Telecommunications Cabling
 - 2. ANSI/TIA 568.1-D – Commercial Building Telecommunications Cabling Standard
 - 3. BICSI Information Transport Systems Installation Methods Manual (ITSIMM) 7th Edition
 - 4. BICSI Telecommunications Methods Manual (TDMM) 13th Edition
 - 5. NECA 1-2015: Standard for Good Workmanship in Electrical Construction
 - 6. NEMA VE 2 – Cable Tray Installation Guidelines, 2013
 - 7. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination
 - 1. Install and coordinate the Work in cooperation with interrelated Work.
- B. Scheduling
 - 1. Review the Contract Documents and the overall construction schedule to determine all interfacing and timing of the Work.

- C. Notification
 - 1. Notify the Contract Administrator:
 - a. Where the document references sections that are unavailable.
 - b. Where conflicts arise from requests in the documentation, request clarification from the Consultant through the project's RFI process.

1.04 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified or required; include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings:
 - 1. Provide schematic drawings locating all outlet backboxes and conduit stubups, including wall-mounted and floor boxes.
- C. Samples: Submit a sample for each component.
- D. Special Procedure Submittals
 - 1. Deliver-in-time installation strategy.
- E. Qualification Statements
 - 1. Project Manager
 - a. Provide a statement for Project Manager who should possess a Registered Communications Distribution Designer qualification, be in good standing with BICSI, and has demonstrable experience managing similar projects in size and scope to this project.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each product
- B. Warranty Documentation: For the system
- C. Record Documentation
 - 1. Record drawings indicating the location of all components and component identification.

1.06 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals
 - 1. Restriction of Hazardous Substances Directive compliant
- B. Qualifications
 - 1. Manufacturers:
 - a. ISO 9001 – Quality Management Certification
 - b. ISO 14001 – Environmental Management Certification
 - c. ISO 27001 – Information Security Management Certification
 - 2. Suppliers
 - a. Manufacturer's Approved Status
 - 3. Installers
 - a. Site supervisor:
 - (a) BICSI Technician (TECH)
 - b. Project Manager
 - 1) BICSI Registered Communications Distribution Designer (RCDD)
 - 2) Project management certification, one of the following at minimum:
 - (a) Project Management Professional (PMP)
 - (b) BICSI Registered Telecommunications Project Manager (RTPM)
 - (c) Manager (RTPM)

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Deliver in manufacturer's original unopened and undamaged packages with manufacturer's labels legible and intact.

- a. Except if removing packaging offsite to reduce waste as part of a documented deliver-in-time installation strategy.
- 2. Inspect manufacturer's packages upon receipt.
- B. Storage and Handling Requirements: Protect from moisture, falls and compaction.
- C. Packaging Waste Management: Recycle all materials.

1.08 WARRANTY

- A. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 COMPONENTS – TWISTED PAIR BACK BOX

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Manufacturer List
 - a. Randl Industries, Inc.
 - b. Thomas & Betts.
 - 2. Substitution Limitations: Submit substitution request in accordance with Section 01 25 00 – Substitution Procedures.
- B. Description
 - 1. Regulatory Requirements
 - a. Not applicable
- C. Performance/Design Criteria
 - 1. 127 mm x 127 mm x 72.5 mm (5 in. x 5 in. x 2.875 in.)
 - 2. Side knockouts:
 - a. One (1) 1 ¼" on each side.
 - 3. Integral cable management within the box
 - 4. Galvanized steel

2.02 COMPONENTS – EXTENSION RING

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Manufacturer List
 - a. Randl Industries, Inc.
 - b. Thomas & Betts.
 - 2. Substitution Limitations: Submit substitution request in accordance with Section 01 25 00 – Substitution Procedures.
- B. Description
 - 1. Regulatory Requirements
 - a. Not applicable
- C. Performance/Design Criteria
- D. 127 mm x 127 mm x 13 mm (5 in. x 5 in. x 0.5 in.)
- E. Galvanized steel
- F. Extension ring for twisted pair back box to allow presentation of standard 106-style face plate.

2.03 SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Manufacturer List
 - a. Atkore International.
 - b. ABB Installation Products, Inc.
 - c. Condux International, Inc.
 - d. Eaton Corporation Plc.
 - e. Emerson Electric Co.
 - f. Fibertek Inc.
 - g. Hubbell Incorporated.

- h. Triangle Wire and Cable, Inc.
 - i. Zekelman Industries.
 - 2. Substitution Limitations: Submit substitution request in accordance with Section 01 25 00 – Substitution Procedures.
- B. Description
- 1. Regulatory Requirements
 - a. As appropriate to the component:
 - 1) UL Listed for Standard for Electrical Intermediate Metal Conduit – Steel (UL 1242)
 - 2) UL Listed for Conduit, Tubing and Cable Fittings (UL 514B)
 - 3) UL Listed for Hardware for the Support of Conduit, Tubing and Cable (UL 2239)
 - 4) UL Listed for Electrical Rigid Metal Conduit – Steel (UL 6)
 - b. Trade Agreements Act (TAA) Compliant
- C. Types
- 1. Rigid Steel Conduit:
 - a. Atkore International, Triangle Wire and Cable, Inc. Zekelman Industries,
 - 2. PVC-Coated Steel Conduit:
 - a. Rob-roy Industries, Inc. (Rob-Roy Red) or Occidental Coating Company (O-Cal Blue).
 - 3. PVC Rigid Conduit:
 - a. Carlon, Rob-roy Industries, Inc. or Cantex.
 - 4. Multi-Cell Raceway Electrical Metallic Tubing (EMT) Conduit:
 - a. Carlon Multi-Gard Multi-Cell Raceway EMT or submitted and owner-approved equivalent.
 - 5. Multi-Cell Raceway Galvanized Steel Conduit:
 - a. Carlon Multi-Gard Multi-Cell Raceway Galvanized Steel or submitted and owner-approved equivalent.
 - 6. Conduit Fittings and Bodies:
 - a. Crouse-Hinds, Appleton Electric, Killark Electric Manufacturing Company or O-Z/Gedney.
 - 7. Measured pull tape – pull tape printed with sequential footage markings for accurate measurements:
 - a. Fibertek, Condux International
- D. Requirements
- 1. Fabricate conduit, fittings, and bodies to form a continuous support system for communications cables.
 - 2. PVC-Coated Rigid Steel Conduit and Fittings: Follow NEMA RN1 (Type A).
 - 3. Rigid Steel Galvanized Conduit and Fittings Before Coating:
 - a. Follow FS WW-C-581d, ANSI C80.1, and UL 6.
 - b. Pass bending, ductility, and thickness of zinc coating in ANSI C80.1.
 - 4. Nonmetallic Conduit and Fittings: Pass NEMA TC2, UL 651 and 651A and FS W-C-1094A. EMT fittings shall be formed steel compression ring type. Die cast fittings are not allowed.
 - 5. All conduits, fittings, junction and pull boxes shall be UL Listed.
 - 6. All conduits, fittings, junction and pull boxes shall comply with the NEC.
 - 7. Conduit Bodies: Follow UL 514B and FS W-C-58C. Furnish sufficient coating for touch up after installation.
 - 8. Conduit Fittings
 - a. All fittings shall be compression or threaded.
 - b. Fittings shall provide a secure connection for pulling communications cables.
 - c. Setscrew fittings are not permitted.
 - 9. Conduit “condulets” are not permitted.

10. Non-metallic conduits are not permitted in above-ground installations. Conversion fittings are required for non-metallic (below ground) to metallic (above-ground) transitions.
11. Measured pull tape
 - a. Shall be pre-lubricated, woven polyester, low friction, and high abrasion resistant yarn.
 - b. Minimum average tensile strength shall be 54.43 kgs (1130 lbs.) for 38.1 mm (1.5 in.) and smaller conduits and innerduct.
 - c. Minimum average tensile strength shall be 816.46 mm (1800 lbs.) for conduits larger than 38.1 mm (1.5 in.).
12. Junction boxes, gutters, pull boxes
 - a. All junction boxes, gutters and pull boxes shall comply with NEC Article 314.
 - b. All junction boxes, gutters and pull boxes shall meet the following minimum material requirements:
 - 1) 16-gauge steel or larger.
 - 2) Seams shall be continuously welded and grounded smooth.
 - 3) Continuous hinge (where possible).
 - 4) External screws and clamps.
 - 5) External mounting feet (where possible).
 - 6) Oil-resistant gasket and adhesive.
 - 7) ANSI 61 gray polyester powder coating inside and out over phosphatized surface.
 - 8) UL 50 type 12.
 - c. All junction boxes, gutters and pull boxes shall be provided with the following:
 - 1) Proper knockouts for the required number of conduits.
 - 2) Shall be provided with proper bushings for conduits and/or cabling.
 - 3) Shall have a securely installed hinged access cover.
 - d. All junction boxes, gutters and pull boxes shall be securely installed.
 - e. All junction and pull box sizes for single and multiple conduit runs shall comply with BICSI TDMM.
 - f. Gutter sizes for single conduit runs shall comply with BICSI TDMM.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions
 1. Check actual site conditions before starting any Work.
 2. Ensure all preceding Work associated with the telecommunications system is accurate and complete before proceeding with the installation or use of products specified in this section.

3.02 INSTALLATION

- A. Install as per:
 1. The manufacturer's recommended installation instructions
 2. ANSI/NECA/BICSI 568-2006
 3. BICSI ITSIMM
 4. NECA-1
 5. NFPA 70
- B. Locations and Types:
 1. Install PVC-coated conduits in outdoor above-ground locations, inside valve vaults and wet wells, and in corrosive and wet environments.
 2. Install PVC conduits in buried duct banks or encased in concrete. Use PVC-coated rigid steel elbows for stubouts.
 3. Install exposed conduit parallel or perpendicular to lines of existing construction and grouped together where possible, without interfering with use of premises or working

areas. Prevent safety hazards and interference with operating and maintenance procedures.

4. Conduit may pass through areas with temperature differential of 20 degrees F or more. Seal with proper fitting at barrier between areas of differing temperature.
5. Do not install conduit in interference with equipment placement or operation; piping; structural members; maintenance access; indicated future equipment.
6. Contractor's RCDD supervisor shall coordinate with Drawings of other disciplines to determine availability of space for installation.

C. Conduit Sizing, Arrangement and Support:

1. Conduit fill shall comply with TIA-569-C.
2. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for thirty percent additional conduits whenever possible.
3. Support un-encased conduit with clamps, hangers, straps and metal framing channel attached to building structure.
4. Arrange conduit supports to prevent alignment distortion by wire pulling operations. Fasten conduits using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.
5. For conditions where existing supports are insufficient, install rigid support system, securely attached to building structural members only, plumb, level and in true alignment with related and adjoining work.
6. Support conduit 50.8 mm (2 in.) and larger at 3.05 m (10 ft.) on center maximum, and conduit 38.1 mm (1.5 in.) and smaller at 2.43 m (8 ft.) on center maximum.
7. Fasten 38.1 mm (1.5 in.) and smaller conduit to concrete, masonry or steel with either one-hole malleable iron conduit straps, or "Korn" clamps, or U-bolts; for larger diameters, use two-hole straps. Use "clamp backs" for strapping conduits to planar surfaces.
8. Provide PVC-coated or stainless steel supports for PVC-coated conduit.
9. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.
10. Allow minimum 6.35 mm (0.25 in.) clearance from vertical surfaces to prevent dirt and moisture buildup behind conduit.

D. Design Considerations:

1. Contractor's RCDD supervisor shall coordinate material changes to design with the Program Manager.
2. Fabricate bends free of indentations or elliptical sections.
3. The minimum bend radius is six times the conduit ID for a 50.8 mm (2 in.) conduit or less.
4. The minimum bend radius is ten times the conduit ID for a conduit greater than 2 inches.
5. The minimum bend radius is eight times the conduit ID for a conduit supporting the TBB for a 50.8 mm (2 in.) conduit or less.
6. Below grade conduit shall extend four inches AFF with a bushing.
7. Ceiling conduit or sleeves shall extend four inches below finished ceiling with a bushing.
8. All stubbed conduit ends shall be provided with a ground bushing.
9. All conduit penetrations shall be provided with the proper conduit sleeves.
 - a. Sleeves shall extend three inches AFF or four inches below finished ceiling, with a bushing.
 - b. Sleeves shall be installed in the communications room floor or ceiling a minimum of 50.8 mm (2 in.) to 101.6 mm (4 in.) on center from the wall.
 - c. Conduit floor sleeves shall be spaced in increments to equal the conduit outside diameter from each other.
 - d. Shall be installed in a single tier or row from left to right horizontally.
 - 1) If two tiers or rows are required the conduits shall be staggered between tiers.
 - 2) No more than two tiers or rows are permitted.

10. Cable support anchors shall be installed 457.2 mm (18 in.) to 609.6 mm (24 in.) above the sleeves.
 - a. All conduit penetrations shall comply with all applicable fire codes. All conduit penetrations in fire-rated walls or floors shall be sealed and fire proofed to at least the rating of the penetration area.
 - b. Conduits shall be routed in the most direct route, with the fewest number of bends possible.
 - c. There shall be no continuous conduit sections longer than 30.48 m (100 ft.). For runs that total more than 30.48 m (100 ft.), insert junction or pull boxes (or gutters if appropriate) so that no continuous run between pull boxes is greater than 30.48 m (100 ft.)
 - d. There shall be no more than two 90-degree bends (180 degrees total) between conduit pull boxes.
 - e. Terminate conduit in sheet metal enclosures. Outdoor enclosures shall be furnished with threaded hubs. Side penetrations in the enclosure are not permitted.
 - f. Changes in direction shall be accomplished with sweeping bends observing minimum bend radius requirements above. Do not use pull boxes for direction changes unless specifically designated otherwise in the Drawings.
 - g. Unless otherwise noted in the Drawings, conduits entering pull boxes shall be aligned with exiting conduits.
 - h. Pull boxes shall be placed in readily accessible locations at a height to clear the ceiling grid with box door open.
- E. Separation requirements – following are the minimum separation requirements between communications and power cables.
 1. Unshielded power lines or electrical equipment in proximity to open or non-metal pathways:
 - a. Less than 2 kVA – 127 mm (5 in.)
 - b. 2 to 5 kVA – 304.8 mm (12 in.)
 - c. Greater than 5 kVA – 609.6 mm (24 in.)
 2. Unshielded power lines or electrical equipment in proximity to grounded metal conduit pathway:
 - a. Less than 2 kVA – 63.5 mm (2.5 in.)
 - b. 2 to 5 kVA – 152.4 mm (6 in.)
 - c. Greater than 5 kVA – 304.8 mm (12 in.)
 3. Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal conduit pathway:
 - a. 2 to 5 kVA – 76.2 mm (3 in.)
 - b. Greater than 5 kVA – 152.4 mm (6 in.)
- F. Installation:
 1. Install conduit mechanically secure, mechanically protected from physical harm, electrically continuous, and neat in appearance. Ensure interior of conduit is clean and smooth to permit pulling conductors without damage to insulation. Wrench-tighten threaded connections.
 2. Cut conduit ends square, leaving a flat conduit face. Do not use plumbing pipe cutters.
 3. Deburr ends.
 4. Cut threads with standard conduit dies providing 19.05 mm (0.75 in.) taper per foot and of proper length to make joints and terminals tight and without deformation.
 5. Use thread cutting oil continuously during threading. Remove metal cuttings and oil after cutting and before painting (if any).
 6. Use non-corrosive "Carbozinc No. 11" manufactured by Carboline Company, coal tar enamel or zinc rich epoxy primer on threads of steel conduit before connection.
 7. Use only strap wrenches to tighten joints in plastic coated rigid steel conduit. Replace conduit and fittings showing cuts, nicks and threader chuck jaw marks and other damage. Use solvent, or the same patching material, to seal around edges of conduit fitting covers.

8. Protect conduit terminations from mechanical damage, and prevent entry of moisture, dirt and foreign matter into the conduit system by properly capping terminations.
 9. Fit conduit crossing structure expansion joints with approved expansion fittings and bonding jumpers.
 10. Seal annular space at conduit penetrations through structures and pavement airtight and watertight.
 11. Provide measured pull tape in all conduits and innerduct prior to cable installation. Measured pull tape shall be replaced with standard pull tape (non-measured) when each cable is installed.
- G. Horizontal Conduit Routes
1. Horizontal Conduits
 - a. Horizontal (station) conduit is defined as the conduit run between the communications outlet and the cable tray or communications room as indicated on Drawings.
 - b. Each horizontal conduit run shall be a 1 □ in. metallic conduit and shall be home run from each communications outlet box to the equipment room, terminating equipment or cable tray, as indicated in Drawings.
 - c. Each route shall be installed with the least amount of conduit bends.
 - d. Each single horizontal conduit run shall be provided with a junction or pull box every 30.48 m (100 ft.) maximum distance.
 - e. Each dual horizontal conduit run shall be provided with a junction or pull box every 30.48 m (100 ft.). The quantity of conduits entering the junction or pull box shall equal the number of conduits exiting the junction or pull box.
 - f. Each terminating (outlet end) conduit connection shall be provided with the proper connecting bushing fitting.
 - g. Each originating end (communications room end) shall be provided with the proper connecting ground bushing fitting and properly bonded to ground.
 2. Horizontal Junction/Outlet Boxes
 - a. Each horizontal conduit shall be terminated into an outlet box.
 - b. Each outlet box shall be provided a single-gang mudring.
 - c. Each outlet box shall be a 5" x 5" Telecommunications back box with two (2) 1 □ in. knockouts on top, bottom and each of the sides.
 - d. Each conduit home run shall be provided with a deep 101.6 mm (4 in.) junction box (w/cover) at 30.48 m (100 ft.) intervals and 152.4 mm (6 in.) above each ceiling and wall intersection.
 3. Horizontal conduit entrance in communications rooms – wall entry
 - a. Horizontal conduits shall enter the communications room wall 304.8 mm (12 in.) to 457.2 mm (18 in.) above the top of the cable tray.
 - b. Conduit wall stubs shall be spaced in increments equal to the conduit OD from each other.
 - c. All conduit wall stubs shall be extended to the terminating equipment, electronics, or cable tray, as noted in Drawings.
 - d. Conduit crossovers are not permitted.
 4. Horizontal conduit entrance in communications rooms – ceiling entry
 - a. Horizontal conduits shall enter or be extended from the equipment room ceiling 304.8 mm (12 in.) to 457.2 mm (18 in.) above the top of the cable tray.
 - b. Ceiling conduit stubs shall be spaced in increments equal to the conduit OD from each other.
 - c. All ceiling conduit stubs shall be extended to the terminating equipment, electronics, or cable tray, as noted in Drawings.
 - d. Conduit crossovers are not permitted.
 5. Horizontal conduit entrance in communications rooms – floor entry
 - a. Horizontal conduits shall enter the communications room floor two inches to four inches on center from the wall and shall be stubbed 152.4 mm (6 in.) AFF.

- b. Conduit floor stubs shall be spaced in increments equal to the conduit OD from each other.
- c. All conduit floor stubs shall be extended to the terminating equipment, electronics, or cable tray, as noted in Drawings, by routing up the wall, between the wall and the wall-mounted cable tray side rail, and extending 304.8 mm (12 in.) to 457.2 mm (18 in.) above the top of the cable tray.
- d. Conduit crossovers are not permitted.
- 6. Horizontal conduit-to-cable tray
 - a. Only the terminating end of horizontal communication conduits shall be attached to the cable tray.
 - b. Non-communications conduit shall not be attached to the cable tray in any fashion.
 - c. Conduit terminating end shall be attached to cable tray side rail with "conduit-to-cable tray" clamps. No other form of attachment shall be permitted.
 - d. Top or bottom cable tray conduit feeds and attachments are not permitted.
- 7. Riser Conduit Routes
 - a. Riser conduit entrance in communications rooms – wall entry
 - 1) Riser conduits shall enter the communications room wall a minimum of 609.6 mm (24 in.) above the top of the cable tray.
 - 2) Conduit wall stubs shall be spaced in increments to equal the conduit OD from each other.
 - 3) Riser conduits shall be installed in a single tier or row from left to right horizontally.
 - (a) If two tiers or rows are required the conduits shall be staggered between tiers.
 - (b) No more than two tiers or rows are permitted.
 - b. All conduit wall stubs shall be extended to and over the cable tray to access cable tray pathway.
 - c. All riser conduit stubs shall be provided with the proper universal drop-out/ waterfall cable exit runway, which shall be supported by and mounted to channel strut.
 - d. Conduit crossovers are not permitted.
 - e. Riser conduit entrance in communications rooms – floor entry
 - 1) Riser conduits shall enter the communications room floor 50.8 mm (2 in.) to 101.6 mm (4 in.) on center from the wall and shall stub up 152.4 mm (6 in.) AFF.
 - 2) Conduit floor stubs shall be spaced in increments to equal the conduit OD from each other.
 - 3) Riser conduits shall be installed in a single tier or row from left to right horizontally.
 - (a) If two tiers or rows are required the conduits shall be staggered between tiers.
 - (b) No more than two tiers or rows are permitted.
- 8. Exiting cable shall be extended to the bottom of the cable tray and be provided with cable support anchors and secured with supporting hardware every 152.4 mm (6 in.) above the conduit bushings.
- 9. Conduit floor stubs shall be extended to the terminating equipment, electronics, or cable tray, only when noted in Drawings. When required conduits shall be routed up the wall, between the wall and the wall-mounted cable tray side rail, and extended 304.8 mm (12 in.) to 457.2 mm (18 in.) above the top of the cable tray.
- 10. The riser cable shall be extended in the cable tray to the terminating equipment, as noted in the Drawings.
- 11. Conduit crossovers are not permitted.
- 12. All metallic conduits shall be grounded to the telecommunications ground bus bar at each end.

H. Multi-Cell Raceway

1. All multi-cell galvanized steel entry conduit stubs shall be transitioned to multi-cell EMT egress conduit.
2. All multi-cell galvanized steel conduit room stubs shall be transitioned to multi-cell EMT conduit using the proper metallic connecting fittings.
3. Within the communications rooms, only non-metallic Riser Gard innerduct shall be extended from the conduit stub to the terminating equipment.
4. Manufacturer's non-metallic connecting fitting shall be used at all connections.

3.03 REINSTALLATION

- A. No additional burden to the Owner regarding costs, network downtime, or end-user interruption shall result from the reinstallation of specified components.
- B. Coordinate any reinstallation work, in writing, with the Owner.

3.04 SITE QUALITY CONTROL

- A. Nonconforming Work: Reinstall

3.05 CLEANING

- A. Clean as recommended by Manufacturer. Do not use materials or methods which may damage the surface or surrounding construction.
- B. Waste Management: Recycle all detritus.

3.06 PROTECTION

- A. Protect the grounding and bonding system from subsequent construction operations.

END OF SECTION

SECTION 270800 COMMISSIONING OF COMMUNICAITONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for all Structured Cabling System (SCS) testing, including certification and documentation of all test results to confirm the installed connectivity system complies with industry standards and specific category and performance ratings.
- B. Related Requirements
 - 1. Section 27 15 13 Communications Copper Horizontal Cabling

1.02 REFERENCES

A. Abbreviation and Acronyms

- | | |
|------------|--|
| 1. ACR | Attenuation to Crosswalk Ratio |
| 2. ACR-F | Attenuation Crosstalk Ratio Far-end |
| 3. ANSI | American National Standards Institute |
| 4. BICSI | Building Industry Consulting Services International |
| 5. CA | Contract Administrator |
| 6. CSV | Comma-Separated Values |
| 7. DC | Direct Current |
| 8. FEXT | Far end crosstalk |
| 9. FP | Fabry-Perot laser |
| 10. ITSIMM | Information Technology Systems Installation Methods Manual |
| 11. IEC | International Electrotechnical Commission |
| 12. ISO | International Organization for Standardization |
| 13. ISP | Internet Service Provider |
| 14. LED | Light-emitting diode |
| 15. LOMMF | Laser Optimized Multimode Fiber |
| 16. NEMA | National Electrical Manufacturers Association |
| 17. NEXT | Near-end Crosstalk |
| 18. NFPA | National Fire Protection Association |
| 19. NRTL | Nationally Recognized Testing Laboratory |
| 20. NVP | Nominal Velocity of Propagation |
| 21. OD | Overall Diameter |
| 22. OLTS | Optical Loss Test Set |
| 23. OSP | Online Service Provider |
| 24. OTDR | Optical Time Domain Reflectometer |
| 25. PC | Personal Computer |
| 26. PMP | Project Management Professional |
| 27. PS | Power Sum |
| 28. RCDD | Registered Communications Distribution Designer |
| 29. RTPM | Registered Telecommunications Project Manager |
| 30. SCS | Structured Cabling Test |
| 31. ScTP | Screened Twisted-Pair |
| 32. SOW | Statement of Work |
| 33. TAA | Trade Agreements Act |
| 34. TECH | BICSI Technician |
| 35. TIA | Telecommunications Industry Association |
| 36. UL | Underwriters Laboratory, an NRTL |
| 37. USB | Universal Serial Bus |
| 38. UTP | Unshielded Twisted-Pair |
| 39. VCSEL | Vertical-cavity surface-emitting laser |

- B. Definitions
 - 1. Margin is the difference between the measured value and the corresponding test limit value.
 - 2. Worst-case margin identifies the smallest margin over the entire frequency range; the point at which the measured performance is closest to the test limit.
- C. Reference Standards
 - 1. ANSI/TIA-1152-A – Requirements for Field Test Instruments for Balanced Twisted Pair Cabling
 - 2. ANSI/TIA 568-D.2 – Balanced Twisted-Pair Telecommunications Cabling and Components Standard
 - 3. TIA-526-7-A – Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Adoption of IEC 61280-4-2 edition 2: Fibre-Optic Communications Subsystem Test Procedures – Part 4-2: Installed Cable Plant – Single-Mode Attenuation and Optical Return Loss Measurement
 - 4. TIA-526-14-C – Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; Modification of IEC 61280-4-1 edition 2, Fiber-Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant-Multimode Attenuation Measurement
 - 5. ISO/IEC 14763-2 - Information technology -- Implementation and operation of customer premises cabling -- Part 2: Planning and installation, 2012
 - 6. BICSI Information Transport Systems Installation Methods Manual (ITSIMM) 7th Edition
 - 7.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination
 - 1. Install and coordinate the Work in cooperation with interrelated Work.
- B. Scheduling
 - 1. Review the Contract Documents and the overall construction schedule to determine all interfacing and timing of the Work.
- C. Notification
 - 1. Notify the Contract Administrator:
 - a. Where the document references sections that are unavailable.
 - b. Where conflicts arise from requests in the documentation, request clarification from the Consultant through the project's RFI process.
 - c. Three (3) days before field testing.

1.04 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified or required; include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Certificates: Calibration and service record of each certification test device
 - 1. Provide proof that the test device calibration is within the Manufacturer's recommended period.
- C. Special Procedure Submittals
 - 1. Deliver-in-time installation strategy.
- D. Qualification Statements
 - 1. Project Manager
 - a. Provide a statement for Project Manager who should possess a Registered Communications Distribution Designer qualification, be in good standing with BICSI, and has demonstrable experience managing similar projects in size and scope to this project.

1.05 CLOSEOUT SUBMITTALS

- A. Record Documentation:

1. Present all test results verifying the installed link, permanent link and channel performance parameter results for all cable types at least one (1) week before the placement of any active electronics in telecommunication spaces.
 2. The test result submittal shall contain the following:
 - a. Testing, verification, and documentation of all performance specification parameters for data cables in all telecommunication spaces.
 - b. Identify the types of cable test device(s) and interface adapters used during testing and certification when presenting the results for each type of cable and each test procedure.
 - c. Print directly from the testing device software application in both paper and electronic.
 - d. Present paper results in a three (3) ring binder, sectioned according to floor and cable type.
 - 1) Where applicable:
 - 2) OSP
 - 3) ISP
 - 4) Copper horizontal
 - 5) Copper backbone
 - 6) Optical fiber cable horizontal
 - 7) Optical fiber cable backbone
 - e. Present electronic results on a USB drive in the testing device's native file type with a copy of the electronic software used to generate the test results.
 3. The last calibration/service record of each certification test device.
- B. Copper Test Results Documentation
1. Transfer the test results/measurements into a Microsoft Windows-based database utility that allows for the maintenance, inspection and archiving of these test records.
 2. Guarantee that the measurement results transfer to the USB drive unaltered (i.e., as saved in the test device) at the end of each test and that these results cannot be modified at a later time.
 3. The database for the completed job shall be stored and delivered on USB including the software tools required to view, inspect, and print any selection of test reports.
 4. Provide a PDF of the test results.
 - a. The identification of the link per the naming convention defined in Section 27 05 53.
 - b. The overall pass/fail evaluation of the link-under-test including the NEXT Headroom (overall worst-case) number.
 - c. The date and time the test results were saved in the memory of the test device.
 5. General Information to be provided in the electronic database with the test results information for each link:
 - a. The identification of the customer site as specified by the end-user.
 - b. The identification of the link per the naming convention defined in the overall system documentation.
 - c. The overall pass/fail evaluation of the link-under-test.
 - d. The name of the standard selected to execute the stored test results.
 - e. The cable type and the value of NVP used for length calculations.
 - f. The date and time the test results were saved in the memory of the test device.
 - g. The brand name, model and serial number of the test device.
 - h. The identification of the test device interface.
 - i. The revision of the test device software and the revision of the test standards database in the test device.
 - j. Length
 - 1) Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 100 mm (□ 4 in.) and the test limit value.
 - k. Propagation delay:

- 1) Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value.
 - l. Delay Skew:
 - 1) Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value.
 - m. Insertion Loss (Attenuation):
 - 1) Minimum test results documentation as explained in Part 2 for the worst pair.
 - n. Return Loss:
 - 1) Minimum test results documentation as explained in Part 2 for the worst pair as measured from each end of the link.
 - o. NEXT, ACR-F:
 - 1) Minimum test results documentation as explained in Part 2 for the worst pair combination as measured from each end of the link.
 - p. PS-NEXT and PS ACR-F:
 - 1) Minimum test results documentation as explained in Part 2 for the worst pair as measured from each end of the link.
 - q. DC Loop Resistance.
 - r. DC Resistance Unbalance.
 - s. Plot Data.
- C. Optical Fiber Test Results Documentation
1. Transfer test results saved within the field test instrument onto a USB drive formatted for use in a Microsoft Windows PC.
 2. Do not save the test results as CSV.
 3. Contain the following information.
 - a. The identification of the customer site as specified by the end-user.
 - b. The name of the test limit selected to execute the stored test results.
 - c. The name of the personnel performing the test.
 - d. The date and time the test results were saved in the memory of the test device.
 - e. The manufacturer, model and serial number of the field test instrument.
 - f. The version of the test software and the version of the test limit database held within the test instrument.
 - g. The fiber identification number.
 - h. The length for each optical fiber.
 - i. The index of refraction used for length calculation when using a length capable OLTS.
 - j. OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (the difference between the measured attenuation and the test limit value).
 - k. The overall pass/fail evaluation of the link-under-test for OLTS measurements.
 - l. A picture or image of each fiber end-face and a pass/fail status of the end-face based upon visual inspection.
- D. Software
1. Any specialist software necessary to view, inspect and print any selection of test results or report in the testing device's native file type.
 2. Licenses.
 3. Subscriptions.
 4. Software and Firmware Operational Documentation.

1.06 QUALITY ASSURANCE

1. Testing Team
 - a. Test Technician:
 - 1) BICSI Technician (TECH)
 - 2) Manufacturer certified to use their test device

- (a) Fluke Certified Cabling Test Technician Program
- b. Project Manager
 - 1) BICSI Registered Communications Distribution Designer (RCDD)
 - 2) Project management certification, one of the following at minimum:
 - (a) Project Management Professional (PMP)
 - (b) BICSI Registered Telecommunications Project Manager (RTPM)
 - (c) Manager (RTPM)

1.07 SITE CONDITIONS

- A. Ambient Conditions: Do not conduct any testing for certification of copper cabling until the electrical power for the entire site is live and operational.

PART 2 PRODUCTS

2.01 COPPER CABLE TEST DEVICE

- A. Manufacturer List
 - 1. Fluke Corporation
- B. Product Options
 - 1. Select analyzer to comprehensively certify each category rated connection and record results verifying compliance with TIA performance specifications to meet the category rating of the system.
 - a. DTX CableAnalyzer
- C. Performance/Design Criteria
 - 1. Capacities
 - a. Must comply with the accuracy requirements for field test device as defined in ANSI/TIA-1152.
 - b. Must meet or exceed TIA Level IV compliant network cable testing device certification by an independent laboratory, such as Intertek, for verification of high speed, TIA-568 compliant cables.
 - c. Copper test equipment capable of certifying Category-3, Category-5e, Category-6, Category-6A, Category 7 and Category 8 UTP/ScTP links or channels independent of termination hardware configuration (8P8C, jack or 110-style) for each level of performance.
 - d. Provide full two-way auto test of Category-3, 5E, 6, 6A, 7 and 8 twisted-pair links.
 - e. Store full frequency sweep data for all tests and print color graphical reports for all swept measurements.
 - f. Be within the device test manufacturer's recommended calibration period.
 - g. The test device including the appropriate interface adapter must meet the specified accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) as specified in ANSI/TIA-1152.
 - h. The 8P8C test plug shall fall within the values specified in ANSI/TIA-568-D.2 for NEXT, FEXT and Return Loss.
 - i. The adapter cord cable cannot be of twisted-pair construction.
 - 2. Be capable of conducting the following tests as per ANSI/TIA-568-D.2
 - a. Wire Map:
 - 1) If test device determines wiring is correct reports pass.
 - 2) Include the continuity of the shield connection if present.
 - b. Length:
 - 1) Capable of measuring the length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP.
 - 2) Calculate the physical length of the link using the pair with the shortest electrical delay.
 - 3) Report and use for making the pass/fail decision.

- 4) The pass/fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 m (□ 295 ft))) plus 10 percent to allow for the variation and uncertainty of NVP.
- c. Insertion Loss (Attenuation):
 - 1) Test through the required frequency range in maximum step size of 1 MHz.
 - 2) Measure insertion loss at the same frequency intervals as NEXT Loss to provide a more accurate calculation of the ACR parameter.
 - 3) Minimum test results documentation (summary results):
 - (a) Identify the worst wire-pair (1 of 4 possible).
 - (b) The test results for the worst wire-pair must show the highest attenuation value measured (worst-case), the frequency at which this worst-case value occurs, and the test limit value at this frequency.
- d. NEXT Loss:
 - 1) Test pair-to-pair NEXT loss for each wire-pair combination from each end of the link (a total of 12 pair combinations).
 - 2) Measure through the required frequency range.
 - 3) Does not exceed the maximum step size for NEXT Loss measurements as defined in ANSI/TIA-568-D.2 Table 1.
 - 4) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair combination that exhibits the worst-case NEXT margin and the wire-pair combination that exhibits the worst value of NEXT (worst-case).
 - (b) Include the frequency at which it occurs as well as the test limit value at this frequency.
- e. PS-NEXT Loss:
 - 1) Evaluate and report for each wire-pair from both ends of the link-under-test (a total of eight results).
 - 2) Evaluate through the required frequency range, and the step size may not exceed the maximum step size defined in ANSI/TIA-568-D.2 as shown in Table 1.
 - 3) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair that exhibits the worst-case margin and the wire-pair that exhibits the worst value for PS-NEXT.
 - (b) Identify for the tests performed from each end.
 - (c) Include the frequency at which it occurs as well as the test limit value at this frequency.
- f. ACR-F, pair-to-pair:
 - 1) Measure for each wire-pair combination from both ends of the link-under-test.
 - 2) Measure through the required frequency range, and the maximum step size for FEXT Loss measurements shall not exceed the maximum step size defined in ANSI/TIA-568-D.2 as in Table 1.
 - 3) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair combination that exhibits the worst-case margin and the wire-pair combination that exhibits the worst value for ACR-F.
 - 4) Identify for the tests performed from each end.
 - 5) Include the frequency at which it occurs as well as the test limit value at this frequency.
- g. PS ACR-F Loss:
 - 1) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair that exhibits the worst pair combinations for the tests performed from each end.
 - (b) Include the frequency at which it occurs as well as the test limit value at this frequency.
- h. Return Loss:

- 1) Measure from both ends of the link-under-test for each wire-pair.
- 2) Measure through the required frequency range in frequency increments that do not exceed the maximum step size defined in ANSI/TIA-568-D.2 as shown in Table 1.
- 3) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair that exhibits the worst-case margin and the wire-pair that exhibits the worst value for Return Loss.
 - (b) Identify the wire pairs for the tests performed from each end.
 - (c) Include the frequency at which it occurs as well as the test limit value at this frequency.
- i. Propagation Delay:
 - 1) Perform for each of the four wire pairs.
 - 2) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair with the worst-case propagation delay.
 - (b) Include the propagation delay value measured as well as the test limit value.
- j. Delay Skew - as defined in ANSI/TIA-568-D.2
 - 1) Minimum test results documentation (summary results):
 - (a) Identify the wire-pair with the worst-case propagation delay (the longest propagation delay).
 - (b) The report shall include the delay skew value measured as well as the test limit value.
- k. DC Loop Resistance
 - 1) Not to exceed 6.4 Ohm for all four pairs.
 - 2) Minimum test results documentation (summary results):
 - (a) Identify DC Loop Resistance.
- l. DC Resistance Unbalance
 - 1) Not to exceed 120 milliohms or 7.5 percent whichever is greater.
 - 2) Report DC Resistance Unbalance for the following pairs:
 - (a) 1,203,6
 - (b) 1,2-4,5
 - (c) 1,2-7,8
 - (d) 3,6-4,5
 - (e) 3,6-7,8
 - (f) 4,5-7,8
3. Minimum test results documentation (summary results):
 - a. DC Resistance Unbalance.
4. Alien Crosstalk
 - a. Sampling size as per ISO/IEC 14763-2.

2.02 OPTICAL FIBER TEST DEVICE

- A. Manufacturer List
 1. Fluke Corporation
- B. Substitution Limitations: Submit substitution request in accordance with Section 01 25 00 – Substitution Procedures.
- C. Product Options
 1. Select analyzer to comprehensively certify each optical fiber connection and record results verifying compliance with TIA performance standards and manufacturer specifications.
 - a. OptiFiber Pro OTDR.
- D. Performance/Design Criteria
 1. Capacities

- a. The optical fiber source shall permit full end-to-end testing of multimode, Single-mode and LOMMF optical fiber cabling fully compliant with industry standards and manufacturer recommendations.
- b. Available source types and wavelengths shall be as follows:
- c. Multimode - 850nm LED, and 1300nm LED.
- d. Single-mode – 1310nm FP Laser and 1550nm FP Laser.
- e. LOMMF – 850nm VCSEL and 1310nm FP Laser.
- f. The built-in power meter shall be calibrated to read 850, 1310 and 1550nm wavelengths.
- g. All test equipment shall be capable of storing full frequency sweep data for all tests and printing graphical color reports for all swept measurements.
- h. Within the calibration period recommended by the test device's manufacturer to achieve the manufacturer's specified measurement accuracy.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions
 1. Check actual site conditions before starting any Work.
 2. Ensure all preceding Work associated with the telecommunications system is accurate and complete before proceeding with the installation or use of products specified in this section.
- B. Evaluation and Assessment
 1. Verify that all telecommunications cabling is installed and supported, terminated, mounted in an appropriate housing or terminated on the applicable component and labeled before certification testing and documentation.
 2. Verify that all outlets, cables, patch panels, and associated components are fully assembled and labeled before field testing.
 3. Redo any testing performed on incomplete systems.
- C.

3.02 PREPARATION

- A. Ensure that field test instruments have the latest software and firmware installed.
- B. Verify certification test device universal interface adapters and manufacturer patch cords that enable permanent link verification are in new condition and do not indicate any twisting or kinking resulting from incorrect storage of the test device interface adapters.
- C. Inspect optical fiber patch cords and ensure that connector surfaces are clean and free of defects.

3.03 TESTING (APPLICABLE TO ALL CABLE PLANT)

- A. Certification test 100 percent of the installed cabling plant
- B. Certify all existing cabling noted to remain.
- C. Certify all existing cabling relocated as part of the new cable plant.
- D. Follow manufacturers' instructions and recommended industry standards and guidelines to complete all TIA/EIA testing procedures to verify performance levels
- E. Follow manufacturer requirements for self-calibration procedures
- F. Follow BICSI ITSIMM
- G. Perform all tests required by local authorities in addition to tests specified herein
- H. Ensure circuit/cable IDs reported by the test instrument match the printed label ID
- I. Update test device software to show specific project information including but not limited to:
 1. Date and time of testing
 2. Project name

3. Field technician's name
4. Cable identification number
5. Cable manufacturer, type and part number

3.04 COPPER CABLE TESTING

- A. Test every cabling link in the installation in accordance with the field test specifications defined in ANSI/TIA-568-D.2.
- B. To pass the test, all measurements (at each frequency in the required frequency range) must meet or exceed the limit value determined in ANSI/TIA-568-D.2.
- C. Test each cable for:
 1. Wire Map
 2. Length
 3. Insertion Loss
 4. NEXT (Near-end Crosstalk) Loss
 5. PS-NEXT (Power sum Near-end Crosstalk) Loss
 6. ACR-F Loss
 7. PS ACR-F Loss
 8. Return Loss
 9. Propagation Delay
 10. Delay Skew
 11. DC Loop Resistance
 12. Alien Crosstalk
- D. Test the installed twisted-pair horizontal links the point of termination in the telecommunications space to the telecommunication outlet in the work area for compliance with the Permanent Link performance specification as defined in ANSI/TIA-568-D.2.
- E. 100 percent of the installed cabling links must pass the requirements of ANSI/TIA-568-D.2 and as further detailed in this Section.
- F. Diagnose and correct any failing link.
 1. Follow the corrective action with a new test to prove that the corrected link meets the performance requirements.
 2. Provide the final and passing result of the tests for all links in the test results submission.
- G. Use a permanent link interface adapter for the test device that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface.

3.05 OPTICAL FIBER CABLE TESTING

- A. Record link and channel test results from the OLTS in the test device
- B. Test each cabling segment (connector to connector).
- C. Test each cabling channel (equipment to equipment).
- D. Use high-quality test cords of the same fiber type as the cabling under-test.
- E. The test cords for OLTS testing shall be between 1 m (□ 3 ft.) and 5 m (□ 15 ft.) in length.
- F. Optical loss testing for backbone links.
 1. Test multimode backbone links at 850 nm and 1300 nm in accordance with TIA-526-14-C, Method B, One Reference Jumper or the equivalent method.
 2. Test single-mode backbone links at 1310 nm and 1550 nm in accordance with TIA-526-7-A, Method A.1, One Reference Jumper or the equivalent method.
 3. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices (i.e., link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers).
 4. Use the One Reference Jumper Method specified by TIA-526-14-C, Method B and TIA-526-7-A, Method A.1 or the equivalent method.

5. Follow the procedures established by these standards or application notes to conduct performance testing accurately.
- G. OTDR testing
1. Test fiber links at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.
 - a. Multimode: 850 nm and 1300 nm.
 - b. Single-mode: 1310 nm and 1550 nm.
 2. Test each fiber link and channel in both directions.
 3. Install a launch cable between the OTDR and the first link connection.
 4. Install a receive cable after the last link connection.
- H. Magnified end-face inspection
1. Inspect fibers at 250 times or 400 times magnification, as applicable.
 - a. Use 250 times magnification for inspecting multimode and single-mode fibers.
 - b. Use 400 times magnification for a detailed examination of single-mode fibers.
 2. Diagnose and correct scratched, pitted or dirty connectors.
 3. Record end-face images in the memory of the test device.
- I. Length Measurement
1. Electronically measure and record the length of each fiber using an OLTS.
- J. Polarity Testing
1. Test paired duplex fibers in multi-fiber cables to verify polarity in accordance with Clause E.5.3 of ANSI/TIA 568-D.2 using an OLTS.

3.06 SITE QUALITY CONTROL

- A. Site Tests and Inspections
1. Make available for inspection the test results as soon as the tests are complete.
 2. Consider all optical fiber cabling that returns a Fail test to have failed.
 3. The pass or fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section 4.2.2 of ANSI/TIA-1152). Any fail or fail result yields a fail for the link-under-test. To achieve an overall pass condition, the results for each test parameter must be pass.
 4. Consider any link-under-test that returns a pass condition to have failed.
- B. Verification
1. After testing the CA or the telecommunications designer will select a random sample of 5 percent of the installed links and witness the re-testing of those links.
 2. The CA shall compare these results to the initial test results.
 3. If more than 2 percent of the sample results differ in terms of the pass/fail determination, retest all links under the supervision of the CA's representative and bear all associated costs.

3.07 CLEANING

- A. Clean as recommended by Manufacturer. Do not use materials or methods which may damage the surface or surrounding construction.
- B. Waste Management: Recycle all detritus.

3.08 PROTECTION

- A. Protect the grounding and bonding system from subsequent construction operations.

END OF SECTION

SECTION 271513
COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Four-pair unshielded twisted-pair copper horizontal workstation cabling to distribute network signals from telecommunications distribution spaces to workstation outlet locations.
 - 1. Category 6 horizontal cabling
- B. Related Requirements
 - 1. Section 27 08 00 Commissioning of Communications

1.02 REFERENCES

- A. Abbreviation and Acronyms
 - 1. AHJ Authority Having Jurisdiction
 - 2. ANSI American National Standards Institute
 - 3. AWG American Wire Gage
 - 4. BICSI Building Industry Consulting Services International
 - 5. NECA National Electrical Contractors Association
 - 6. NEMA National Electrical Manufacturers Association
 - 7. INSTC BICSI Installer 2, Copper
 - 8. INST1 BICSI Installer 1
 - 9. ISO International Organization for Standardization
 - 10. NFPA National Fire Protection Association
 - 11. NRTL Nationally Recognized Testing Laboratory
 - 12. PMP Project Management Professional
 - 13. RCDD Registered Communications Distribution Designer
 - 14. RTPM Registered Telecommunications Project Manager
 - 15. TIA Telecommunications Industry Association
 - 16. TAA Trade Agreements Act
 - 17. TECH BICSI Technician
 - 18. UL Underwriters Laboratory, an NRTL
 - 19. UTP Unshielded Twisted-Pair
- B. Definitions
 - 1. U/UTP Unshielded Twisted-Pair with no overall shielding
- C. Reference Standards
 - 1. ANSI/TIA-568.1-D – Commercial Building Telecommunications Cabling Standard
 - 2. ANSI/TIA-568.2-D – Balanced Twisted-Pair Telecommunications Cabling and Components Standard
 - 3. ANSI/NECA/BICSI 568-2006 – Standard for Installing Commercial Telecommunications Building Telecommunications Cabling
 - 4. BICSI Telecommunications Methods Manual (TDMM) 13th Edition
 - 5. BICSI Information Transport Systems Installation Methods Manual (ITSIMM) 7th Edition

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination
 - 1. Install and coordinate the Work in cooperation with interrelated Work.
- B. Scheduling
 - 1. Review the Contract Documents and the overall construction schedule to determine all interfacing and timing of the Work.
- C. Notification
 - 1. Notify the Contract Administrator:

- a. Where the document references sections that are unavailable.
- b. Where conflicts arise from requests in the documentation, request clarification from the Consultant through the project's RFI process.

1.04 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified or required; include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Submit including plans, elevations, sections, details, and attachments to other Work.
 - 1. Coordinate shop drawings with 27 11 16 – Communications Cabinets, Racks, Frames and Enclosures.
 - 2. Indicate the complete configuration of each unique cabinet and rack.
 - 3. Provide room layout for all racks, including existing racks with full dimensionality.
- C. Special Procedure Submittals
 - 1. Deliver-in-time installation strategy.
- D. Qualification Statements
 - 1. Project Manager
 - a. Provide a statement for Project Manager who should possess a Registered Communications Distribution Designer qualification, be in good standing with BICSI, and has demonstrable experience managing similar projects in size and scope to this project.
 - 2. Manufacturer's installation certification
 - a. Provide a statement describing the training that installers undergo to receive installation certifications. Describe whether the training is online or in-person, whether candidates are observed pulling and terminating cable, and what the is pass and fail criteria.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each product
 - 1. Manufacturer's manual for the specific piece of equipment
- B. Warranty Documentation: For the system
- C. Record Documentation: Record drawings indicating the location of all the components and component identification.

1.06 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals
 - 1. Restriction of Hazardous Substances Directive compliant
- B. Qualifications
 - 1. Manufacturers:
 - a. ISO 9001 – Quality Management Certification
 - b. ISO 14001 – Environmental Management Certification
 - c. ISO 27001 – Information Security Management Certification
 - d. All components of the vertical cable management system shall be from the same Manufacturer. Who shall be the same manufacturer of the articles from Section 27 11 16.
 - 2. Suppliers
 - a. Manufacturer's Approved Status
 - 3. Installers
 - a. Site supervisor:
 - 1) BICSI Technician (TECH)
 - 2) Manufacturer certified to install their system.
 - b. Installers

- 1) INSTC
- 2) Manufacturer certified to install their system.
- c. Installer's aides
 - 1) INST1
 - 2) Manufacturer certified to install their system.
- d. Project Manager
 - 1) BICSI Registered Communications Distribution Designer (RCDD)
 - 2) Project management certification, one of the following at minimum:
 - (a) Project Management Professional (PMP)
 - (b) BICSI Registered Telecommunications Project Manager (RTPM)
 - (c) Manager (RTPM)

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Deliver in manufacturer's original unopened and undamaged packages with manufacturer's labels legible and intact.
 - a. Except if removing packaging offsite to reduce waste as part of a documented deliver-in-time installation strategy.
 - 2. Inspect manufacturer's packages upon receipt.
- B. Storage and Handling Requirements: Protect from moisture, falls and compaction.
- C. Packaging Waste Management: Recycle all materials.

1.08 SITE CONDITIONS

- A. Ambient Conditions
 - 1. Do not install the equipment in an environment that is not temperature-regulated as per the manufacturer's instructions.
 - 2. Do not install the equipment in an environment that is dirtier than one would ordinarily expect for the room function.

1.09 WARRANTY

- A. Manufacturer Warranty
 - 1. Warranty Period: 25 years from the date of Substantial Completion.

PART 2 PRODUCTS

2.01 FOUR-PAIR UTP CATEGORY 6 CABLING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that you may incorporate into the Work include, but are not limited to, the following:
 - 1. Manufacturer List
 - a. CommScope Inc.
 - 2. Substitution Limitations: None Permitted.
 - 3. Basis of design products:
 - a. CommScope/TE TE620P-BLxx – Blue Sheath Cabling
 - b. CommScope/TE TE620P-WTxx – White Sheath Cabling
- B. Description
 - 1. Regulatory Requirements
 - a. UL Listed
 - b. TAA Compliant
- C. Performance/Design Criteria
 - 1. ANSI/TIA-568.2-D Category 6 copper UTP, twenty-four (24) AWG cable plenum rated cable.
 - 2. ANSI/TIA-568.2-D Category 6 copper UTP, twenty-four (24) AWG cable riser rated cable.
 - 3. Use riser rated cable where AHJ allows.

- D. Provide any accessory products related to the UTP copper cabling required to provide a complete and functional infrastructure system.

2.02 UTP CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that you may incorporate into the Work include, but are not limited to, the following:
1. Manufacturer List
 - a. CommScope Inc.
 2. Substitution Limitations: None Permitted.
 3. Basis of design products:
 - a. Label Holder:
 - 1) COMMScope/TE 6630-2-004-05: Type105 Label holder block (for UMS bkt)
 - 2) COMMScope/TE 6089-2-015-01: Type 105 flip label holder
 - 3) COMMScope/TE 6631-3-100-03: Type 105 flip label holder stock
 - b. Termination Block
 - 1) COMMScope/TE 6636-1-596-46 : 96pr Ultim8 Kit (UMS Bkt, T105 Label block, U8 blocks)
 - 2) COMMScope/TE 6468-5-060-06 : Ultim8 cable termination block, 8pr 10PK
 - c. Wallfield cable management
 - 1) COMMScope/TE 6657-2-005-19/04: 19", 4-ring cable manager (horizontal wire management)
 - d. Jacks and Assemblies
 - 1) COMMScope/TE 6830-1-830-01: White, voice applications
 - 2) COMMScope/TE 6830-1-830-06: Blue, Office and similar general-user
 - 3) data applications
 - 4) COMMScope/TE 6830-1-830-07: Green, Camera locations
 - 5) COMMScope/TE 6830-1-830-08: Yellow, Media Control Applications
 - e. Plastic Faceplate: High-impact plastic.
 - 1) COMMScope/TE 6644-1-152-02 : 1G 2P Faceplate
 - 2) COMMScope/TE 6644-1-154-02 : 1G 4P Faceplate
 - 3) COMMScope/TE 6644-1-164-02 : 2G 4P Faceplate
 - 4) COMMScope/TE 6644-1-168-02 : 2G 8P Faceplate
 - f. 2. Wall phone Metal Faceplate:
 - 1) AllenTel AT630-A4: Wall phone mounting plate, screw tml, 4cond, stainless
 - g. 3. Surface Mount 2-port Box
 - 1) COMMScope/TE 6644-1-222-02: 2P surface mount box
 - h. Blank Inserts
 - 1) COMMScope/TE 6645-1-160-02: Blank insert
- B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-C, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Horizontal Cabling Connecting Blocks (Voice and Data): Provide UMS brackets and blocks for the number of cables terminated on the block, plus 25 percent spare of both UMS brackets and blocks. Integral with connector bodies, including plugs and jacks where indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions
1. Check actual site conditions before starting any Work.
 2. Ensure all preceding Work associated with the telecommunications system is accurate and complete before proceeding with the installation or use of products specified in this section.

3.02 PREPARATION

- A. Surface Preparation
 - 1. Clean telecommunication spaces before installing equipment.
 - a. Vacuum the space's surfaces.

3.03 INSTALLATION

- A. Install as per:
 - 1. The manufacturer's recommended installation instructions
 - 2. ANSI/TIA-568-D.0
 - 3. ANSI/NECA/BICSI 568-2006
 - 4. BICSI ITSIMM
 - 5. NECA-1
- B. Install all cables with proper attention paid to bend radii, pulling method, attachment method, and pulling forces as per ITSIMM.
- C. Follow the cable manufacturer's specifications for each particular cable type.
- D. Visually inspect for sufficient bend radius during and after pulling.
- E. Support cabling at least every 1.5 m (□ 5 ft.).
- F. Label cables at both ends 300 mm (□ 1 ft.) from each cable end.
- G. Label cables contained in conduit at every pull box.
- H. Install appropriate sheath construction for the environment so that they meet the approval of the AHJ.
- I. Meet all TIA and industry standards with special regards to maximum stripping length of cable jackets. Do not remove more than 10 mm (.378 in.) of cable jacket from the termination points.
- J. Tolerances
 - 1. Coordinate outlet positions on site and assume that outlets may move 3 m (□ 10 ft.) from their drawn position.

3.04 REPAIR

- A. Remove and replace any cable failing to meet the requirements of the site quality control site tests and inspections.

3.05 REINSTALLATION

- A. No additional burden to the Owner regarding costs, network downtime, or end-user interruption shall result from the reinstallation of specified components.
- B. Coordinate any reinstallation work, in writing, with the Owner.

3.06 SITE QUALITY CONTROL

- A. Site Tests and Inspections
 - 1. Conduct tests as described in Section 27 08 00 - Commissioning of Communications
- B. Nonconforming Work: Reinstall

3.07 CLEANING

- A. Clean as recommended by Manufacturer. Do not use materials or methods which may damage the surface or surrounding construction.
- B. Waste Management: Recycle all detritus.

3.08 PROTECTION

- A. Protect the grounding and bonding system from subsequent construction operations.

END OF SECTION

SECTION 27 41 16

INTEGRATED AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

- A. It is the intent of these specifications to provide a complete working audio visual system ready for the Owner's use. System acceptance shall be judged on the successful adherence to the installation instructions of this Specification.
- B. Any item not specifically shown on the drawings or called for in the specifications, but normally required to conform to the intent, are to be considered as part of the Work.
- C. Any given item type of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item will not be permitted, unless specifically noted otherwise.
- D. These specifications are equipment and performance specifications and are considered to be one all-encompassing package with the drawings. Actual installation shall be as engineered by the AV contractor with prior approval by the Design Professional.
- E. Provide audio visual devices and equipment with performance levels and capacities as noted herein.

1.2 SCOPE OF WORK

- A. General: Provide audio visual systems design, engineering, and installation within all phases and spaces of the Project. Systems are to include all devices, equipment, installation, programming, and commissioning in accordance with requirements of the contract documents and drawings.
 - 1. The Work detailed within the Contract Documents has been specified to meet certain requirements for performance, appearance, and costs. It shall be the responsibility of the AV Contractor to implement the guidelines and requirements contained in the Contract Documents and translate them into a complete design package containing all elements necessary for a complete, operational, and functionally integrated Audio-Visual System(s).

Provide all work as detailed in the Contract Documents as a turnkey installation including all material, labor, engineering, warranties, taxes, freight, and permits. Only items and requirements specifically stated to be provided by others shall not be a requirement for this Section of the Work.

- B. Work Included:
 - 1. Base AV Work
 - a. Refer to Sections listed in Part 2 for scope requirement and system descriptions for each System Type.
- C. Work Specified Elsewhere
 - 1. Installation of raceway, pull-boxes, plywood backboards and floor-boxes (provided under electrical Work). Coordination is required within the design to verify the appropriate raceways are in place.
 - 2. Cutting, patching and painting of walls, unless damaged performing the work described herein.
- D. Coordinated Work
 - 1. Coordinate with related trades to schedule the Work and ensure a complete installation in accordance with the schedule outlined by the Owner.
 - 2. Installation of support structure. Coordination is required within design to verify size and overall dimensions required.
- E. Design Intent
 - 1. The design intent of the system may require equipment not listed in the attached spreadsheet, but are indicated elsewhere in the contract documents, in either the drawings or the written specification or is required for normal or intended operation of the system. It is the sole responsibility of the Bidder to reconcile the contract documents with the equipment and labor required for this project. In all cases, the most stringent requirements of the contract documents shall be followed.
 - 2. The AV Contractor is to research, design and engineer a complete working and turnkey solution. That solution is to be provided as a part of this bid return with all components of that solution identified inclusive of Manufacturer, Model Number, Quantities (either provided in these documents herein or required for the AVC proposed solution), itemized costs, associated cut sheets as well as a system diagram equal to the level of detail of other fully designed systems within this specification.
 - a. In this situation, the bidder is required to submit 3 references of similar size and complexity within the last 3 years in support of the components identified to include Contact Name, Address, Phone Number and detailed description of the system and application.
 - 3. No claims for additional equipment required will be allowed if the sole reason for such claims is that the equipment was not listed in the attached spreadsheet. It is the sole responsibility of the Bidder to verify the completeness of the proposed solution included in the AVC's bid.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Refer to the following Sections for specifications related to the Work:
 - 1. Section 26 05 00 – Common Work Results for Electrical
 - 2. Section 27 05 26 – Grounding and Bonding for Communications Systems

- C. Refer to the following Sections for specifications for the Data Network:
 - 1. Section 27 21 00 – Data Communications
 - 2. Section 27 21 12 – Data Communications Network Security Appliances
 - 3. Section 27 21 26 – Data Communications Network Management
 - 4. Section 27 21 29 – Data Communications Switches
- D. Refer to the following standards for performance verification related to the Work:
 - 1. INFOCOMM 10-201X, AV Systems Performance Verification

1.4 DOCUMENT ORDER OF PRECEDENCE

- A. While it is the AV Contractor's responsibility to verify the completeness and accuracy of their proposed turnkey solution the following shall serve as general guidance for the order of precedence of any conflicting information.
 - 1. Specifications (including equipment schedules) and TA-700 series drawings
 - 2. TA Infrastructure Package (TA-300 series)

1.5 RELATED WORK

- A. The CM's General Conditions shall be considered part of this Specification. Unless this Section contains statements, which are more definitive or more restrictive than those contained in the Contractor's General Conditions, this Specification shall not be interpreted as waiving or overruling any requirements expressed in the General Conditions.
- B. AV Contractor shall coordinate with CM on raceway/junction box locations for audio visual equipment and routing of audio, video, control, and power cables/raceway from equipment, terminal and pull boxes to system equipment racks. Including but not limited to attending coordination meetings, weekly project meetings, and participating in coordination DWG process.
- C. Related Work: Equipment and materials provided and installed by others, unless otherwise shown in this Section or the Drawings, shall include but are not limited to:
 - 1. Section 26 05 00 – Common Work Results for Electrical
 - 2. Section 26 05 26 – Grounding and Bonding for Electrical Systems
 - 3. Section 26 05 29 – Hangers and Supports for Electrical Systems
 - 4. Section 26 05 33 – Raceway and Boxes for Electrical Systems
 - 5. Section 26 05 36 – Cable Trays for Electrical Systems
 - 6. Section 26 09 23 – Lighting Control Devices
 - 7. Section 26 09 43 – Network Lighting Controls

1.6 DEFINITIONS

- A. The following shall serve as general identifiers as specified herein.
 - 1. Architect – NORR
 - 2. Consultant – Shen Milsom & Wilke LLC (SMW).
 - 3. Owner – The College of New Jersey
 - 4. AV Contractor – The AV Contractor is the firm submitting a proposal to furnish and install the Work as defined within this Specification.
 - 5. Project – TCNJ Roscoe Hall Student Services Renovation
 - 6. Work – The term "Work" means all construction and services specified within this document. The Work includes all related labor, materials, equipment, and services provided, or to be provided, by the AV Contractor to fulfill the proposal's obligations.

7. Drawings – The term “Drawings” means all Audio Visual Systems, Architectural, Electrical Drawings and associated sketches, details, riser diagrams, relative to this project.
- B. As used in the Drawings and Specifications for the Work, certain non-technical words and phrases shall be understood to have specific meanings as follows, regardless of indications to the contrary in the General Conditions or other documents governing the Work.
 1. “Furnish” – Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the Audio Visual Systems Work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims, or encumbrances.
 2. “Install” – Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the Work.
 3. “New” – Manufactured within the past year and never before used.
 4. “Provide” – Furnish and Install.
- C. Regardless of their usage in codes or other industry standards, certain words or phrases as used in the Drawings or Specifications for the Work, shall be understood to have the specific meanings as ascribed to them in the following list:
 1. “Circuit” – Any specific run of circuitry
 2. “Circuitry” – Any Work which consists of wires, cables, raceways, and/or specialty wiring method assemblies complete with associated junction boxes, pull boxes, outlet boxes, joints, couplings, splices, and connections except where limited to a lesser meaning by specific description.
 3. “Concealed” (as applied to circuitry) – Covered completely by building materials, except for penetrations (by boxes and fittings) to a level flush with the surface as necessitated by functional or specified accessibility requirements.
 4. “Exposed” (as applied to circuitry) – Not covered in any way by building materials.
 5. “Normal Work Conditions” – Locations within building confines that are not damp, wet, or hazardous and that are not used for air handling.
 6. “Patch Panel” – A System of terminal blocks, patch cords, and backboards that facilitate administration of cross-connecting cables.
 7. “Raceway” – Any pipe, duct, extended enclosure, or conduit (as specified for a particular System) which is used to contain wires and which is of such nature as to require that the wires be installed by a “pulling in” procedure.
 8. “Riser” – Shall refer to the portion of the installation that transmits between building floors (or between Audio Visual Systems rooms), also referred to as “Backbone Cabling”.
 9. “Audio Visual Closet” – The enclosed area or room specifically designated for the routing, termination, and/or cross connecting of Audio Visual Systems cable (i.e. riser cable) to other Audio Visual Systems cable and/or equipment.
 10. “AV Systems Control Room” and/or “AV Systems Headend” – The enclosed area or room specifically designated for the routing, termination, and/or cross connecting of Audio Visual System cable (i.e. riser cable) to other Audio Visual System cable, and/or equipment and racks.
 11. “AV System(s)” – Audio Visual System(s), includes all components contained herein that work in conjunction to create and completely integrated and fully functioning system as described within the Drawings and Specifications
 12. “Audio Visual Systems Wiring” – see “Circuitry”
 13. “Audio Visual Systems Work” – See “Scope of Work”
 14. “Standard” (as applied to wiring devices) – Not of a separately designated individual type.
 15. “Subject to Mechanical Damage” – Exposed within 2,200 mm of the floor in mechanical rooms, manufacturing spaces, vehicular spaces, or other spaces where heavy items are moved around or rigged as a common practice or as required for replacement purposes.
 16. “System” – See “AV Systems”

17. "Wiring" – see "Circuitry"
 18. "AVC" – Audio Visual Systems Contractor
- D. Where the word "conduit" is used without specific reference to type, it shall be understood to mean "raceway".
- E. Reference to "U.L. (Materials Construction) Standards" shall mean the "Standards for Safety" published by Underwriters Laboratories, Inc.

1.7 REFERENCES

- A. The Audio Visual Systems shall be installed in accordance with the latest applicable revisions pertaining to all applicable national, state, and local codes and standards including, but not limited to the following:
1. Local Governing Authorities Having Jurisdiction
 2. Any portion of the audiovisual work not subject to the requirements of an electrical code published by a specific authority having jurisdiction over such work shall be governed by the National Electrical Code and any and all applicable sections of the National Fire code, as published by the National Fire Protection Association.
 3. Installation procedures, methods and conditions shall be in compliance with the latest requirements of the Federal Occupational Safety and Health Administration (OSHA), the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA).
 4. The AV Contractor is responsible for all costs incurred to meet these codes and conditions.
 5. Additional codes and requirements pertaining to the work:
 - a. NFPA-72 National Fire Alarm and Signaling Code
 - b. International and National Electric Codes (IEC/ NEC)
 - c. IEC 60268-16 Third Edition 2003-05 Objective rating of speech intelligibility
 - d. ANSI/Infocomm
 - 1) 10:2013 Audiovisual Systems Performance Verification
 - 2) 1M:2009 Audio Coverage Uniformity Standard in Enclosed Listener Areas
 - 3) 2M:2010 Standard Guide for Audiovisual Systems Design and Coordination
 - 4) 3M:2011 Projected Image System Contrast Ratio
 - 5) X3T9.5 FDDI
 - 6) X3T9.5 CDDI
 - e. Sustainable Technology Environments Program
 - f. Underwriters Laboratories, Inc. (UL)
 - g. Society of Motion Picture and Television Engineers (SMPTE)
 - h. Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual - latest edition.
 - i. ANSI/TIA/EIA-568-B - Commercial Building Telecommunications Cabling Standard
 - j. ANSI/TIA/EIA-569 - Commercial Building Standards for Telecommunications Pathways and Spaces
 - k. ANSI/TIA/EIA-606-A. Administration Standard for Commercial Telecommunications Infrastructure
 - l. TIA-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
 - m. EIA RS-232 Serial Communications Electrical Interface
 - n. EIA RS-310-C Racks, Panels and Associated Equipment
 - o. FCC Part 15
 - p. FCC Part 68
 - q. IEEE 802.3
 - r. IEEE 802.5
 - s. Article 770 Optical Fiber Cables

- t. Article 800 Communications Circuits
- u. NFPA 70 National Electrical Code
- v. NFPA 75 Protection of Electronic Computer / Data Processing Equipment
- w. United States Green Building Council (USGBC): Leadership in Energy & Environmental Design(LEED®): Green Building Rating System for New Construction & Major Renovations (NC) Version 3.0 (2009) www.usgbc.org.

1.8 AV CONTRACTOR'S GENERAL CONDITIONS

- A. The AV Contractor represents that they are familiar with, and have expertise in the Work of this nature and scope. The AV Contractor further agrees that they shall provide all Work as may be required to make a complete job of that which may not be fully defined in the Contract Documents.
- B. The AV Contractor shall comply with all of the regulations, including safety regulations of national, city, local and other government agencies having jurisdiction concerning the work of the AV Contractor. The AV Contractor shall give all notices and comply with all laws, ordinances, codes, rules, and regulations bearing on the conduct of the Work. If the AV Contractor performs any work, which is contrary to such laws, ordinances, codes, rules and regulations, they shall make all changes for compliance and bear all associated costs.
- C. The AV Contractor shall be responsible to provide and maintain a storage facility. If this storage facility is required to be on-site it shall be the AV Contractor's responsibility to coordinate the size and spatial requirements with the Owner and CM. The AV Contractor shall assume full responsibility for the storage facility and all contents, unless otherwise indicated by the Owner.
- D. The AV Contractor shall provide all protection necessary to safeguard their work from damage by their operations and the operations of others. Unless the AV Contractor proves to the Owner's satisfaction that the Work has been damaged by others, the AV Contractor shall promptly repair, adjust, and clean all defective installations and bear all associated costs.
- E. All of the AV Contractor's work shall be tested and inspected by all authorities having jurisdiction and in accordance with all Specifications. The AV Contractor shall coordinate and cooperate fully and shall provide at no additional cost to the Owner, manpower, blueprints, facilities, scaffolds, etc. to reasonably assist the inspectors.
- F. The project documentation is, in general, diagrammatic and/or developed to communicate design intent. The AV Contractor shall coordinate the installation of all devices and/or equipment with the Owner and CM prior to installation based on the existing field conditions.
- G. The AV Contractor shall examine the site and the Contract Documents and review with the Owner and CM the designated areas of access, delivery, and storage for the AV Contractor's use. The AV Contractor agrees that such areas are satisfactory and sufficient for their needs in the completion of their work and in conformance with the terms of this Contract.
- H. The Owner reserves the right to furnish any materials necessary for the Project.
- I. All permits required for any part of the AV Contractor's work shall be procured and paid for by the AV Contractor. The AV Contractor shall determine all permits required and transmit this information to the CM.

- J. The Owner shall provide to the AV Contractor AutoCAD backgrounds for all required floor plans for the facility. All pre-fabrication and record drawings required for the Project and as stated herein, shall be completed within the latest version of AutoCAD.
- K. The AV Contractor, upon receiving notice from Owner that the AV Contractor has furnished inferior, improper or unsound work or materials (including equipment), or work or materials at variance with that which is specified, will, within 24 hours, proceed to remove such work or materials and make good all other work or materials damaged thereby, and, at the option of the Owner, the AV Contractor shall immediately replace such work or materials with work or materials as specified. The removal, replacement, and repair shall be performed at such times and with manpower sufficient, in the judgment of the Owner, so as to avoid disturbance to occupants, or other ongoing work for the Project.
 - 1. If the AV Contractor does not remove such unsound Work within a reasonable time, the Owner may remove it and may store the material at the expense of the AV Contractor. If the AV Contractor does not pay the expenses of such removal within ten (10) days' time thereafter, the Owner may, upon written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the AV Contractor and all expenses of the sale.
- L. The AV Contractor shall remove all previously installed AV equipment from the spaces as part of the process to install the new room equipment systems. Only equipment utilized in the final operational systems to remain.
- M. The Owner shall have the authority at all times, until final completion and acceptance of the Work, to inspect and reject work and materials which in its judgment are not in conformity with the Drawings and Details, Room Data Sheets and Specifications, and its decision in regard to character and value of Work shall be final and conclusive on both contracting parties. If the Owner permits said Work or materials to remain, the Owner shall be allowed the difference in value or shall at its election have the right to have said Work or materials repaired or replaced, as well as the damage caused thereby, at the expense of the AV Contractor, at any time within one (1) year after the completion of the entire project, or within such longer period as may be covered by any guaranty; and neither payments made to the AV Contractor, nor any other acts of the Owner, shall be construed as evidence of acceptance, waiver, or estoppels.
 - 1. Any expense incurred by the Owner in connection with the foregoing, shall be borne by the AV Contractor, and the Owner may withhold money due to the AV Contractor or recover money already paid to the AV Contractor, to the extent of such expense.
- N. It shall be understood that the Room Data Sheets, Specifications and Drawings are complementary. Where there are conflicts within the documents, the overall design intent shall govern.
- O. To the extent that they govern the Work, the contract documents, Specifications and Drawings also govern change order Work, if any.
- P. The Drawings for the Work utilize symbols and schematic diagrams that have no dimensional significance. The Work shall be installed to fulfill the diagrammatic intent expressed on the Drawings, field layouts, and shop drawings of all trades.
 - 1. AVC is required to supply fully dimensioned elevations and mounting details for all AV components within a space for client and consultant approval.
 - a. Compliance will require field measuring of spaces and comprehensive understanding of any existing equipment which is to be reused in the new system.

- Q. Certain details appear on the Drawings for the Work that are specified with regard to the dimensioning and positioning of the Work. These are intended only for general information purposes. They do not obviate field coordination for individual items of the indicated Work.
- R. Information as to general construction and architectural general construction and architectural features and finishes shall be derived from the structural and architectural drawings and specifications, and may require ongoing coordination with the Architect and CM.
- S. Ratings of devices, materials, and equipment specified without reference to specific performance criteria shall be understood to be nominal or nameplate ratings established by means of industry standard procedures.
- T. It is the intent of the Drawings and Specifications to provide complete operating Audio Visual Systems. All Work necessary to provide such a System shall be performed. Any discrepancies shall be brought to the Consultant's attention.
- U. The Work called for under this Contract shall be carried on simultaneously and/or in the appropriate sequence with the Work of other trades and Owner functions in such a manner as to not delay the overall progress of the construction project. The AV Contractor is responsible for all coordination of the Work with other trades.
- V. Include in the Work all necessary supervision and issuing of all coordination information to any other trades who are supplying work to accommodate the Audio Visual Systems installation.
- W. For items of equipment which are to be installed but not purchased as part of the Work, the Work shall include:
 - 1. Coordination of delivery
 - 2. Unloading from delivery trucks
 - 3. Safe handling and field storage up to the time of permanent placement in the project
 - 4. Correction of any damage to the item(s)
 - 5. Mounting in place and connection(s) as specified
- X. Items which are to be installed, but not purchased as part of the Work shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the Work will be considered only if presented in writing within one (1) week of the date of delivery to the project of the items in question. The Work includes all procedures necessary to put in satisfactory operation all items for which no claims have been submitted as outlined above.

1.9 WARRANTY AND MAINTENANCE

- A. AV Contractor shall provide a one (1) year warranty for the Work with optional costs for 2 & 3 as noted above. The warranty shall cover all Work, Systems, and subsystems against defects in materials and workmanship. The Work as specified herein, including all materials and labor, but excepting any existing devices and equipment which are incorporated in the completed Work, shall be warranted to be free from defects in design, workmanship, and materials. Further, the AV Contractor shall warrant that the completed Systems, including all components (except those, which are existing or provided by others), are of sufficient size and capacity to fulfill the requirements of the Specifications.
- B. In order to maintain certain manufacturer's warranties, system equipment must be installed, aligned and serviced by those installers recognized and authorized by said manufacturers to be capable of performing such duties. If a certain installer is not so authorized by a particular

manufacturer, it is solely their responsibility to make such arrangements to come into such compliance and they shall bear all costs and consequences thereof.

- C. The warranty shall be valid and initiated following the date of System acceptance by the Consultant and/or Owner. System acceptance shall commence when all parts, components, sub-Systems, and Systems have been tested, shown to be working in accordance with the Specification, and approved by the Owner
 - 1. The Bidder is to provide costs for Extended Warranties to cover years 2 and 3 as separate line items.
- D. Warranty Service:
 - 1. In the event that defects in the materials and/or workmanship are identified during the warranty period, the AV Contractor shall provide all labor and materials as may be required for prompt correction of the defect.
 - 2. All manufacturers' equipment warranties shall be activated in the Owner's name and shall commence on the date of system acceptance. In the case of AV Contractor-modified equipment, the manufacturer's warranty is normally voided. In such cases, the AV Contractor shall provide the User with a warranty equivalent to that of the original manufacturer.
 - 3. All repairs required following Substantial Completion of the rooms shall be scheduled at the User's convenience. In no case will the User allow such repairs to interrupt or delay a regularly scheduled event. Notwithstanding the above, all repairs within the regular period of usage must be completed within 24 hours of notification of a failure; 2nd and /or 3rd shift warranty repair activity should be anticipated.
 - 4. Provide written notice to the Owner documenting any Work performed during the warranty period, including any preventative maintenance Work performed.
 - 5. Provide loaner equipment that is fully compatible with the Audio Visual Systems for any equipment not field repairable.
 - 6. Loaner equipment for components that must be shipped to/from the manufacturer or distributor shall be on site and operational within 48 hours of the component failure. Furnish lists of equipment that will require shipment from the manufacturer or distributor and lead times associated with that equipment.
- E. The Bidder shall offer a separate annual service contract, covering all installed systems. The frequency of those visits, as identified and determined by the Bidder and their experience, shall be at regular intervals, in order to perform operational checks of the system(s) and equipment, to clean and service computers, tape machines, and other critical items, to lubricate moving parts as recommended by respective manufacturers and to adjust and align displays and other hardware to insure maintenance of optimum graphical performance. If the Bidder believes certain equipment may require more frequent (or less frequent) servicing that should be identified by component. The service contract shall commence immediately after expiration of the warranty period. A "per-component" price for the service contract shall be submitted with the bid. Provide a detailed plan for and schedule for all suggested periodic maintenance with the bid and describe the potential impact of these tasks with the operation of the room.
- F. The Bidder shall also submit separate pricing for other, non-routine, emergency, "on-call" service visits and an "in-shop" hourly rate for repair and maintenance work.
- G. Service and service contract related costs FOR YEAR 1 shall be incorporated with the costs for the system's base-bid. Costs associated with extended service for years 2 and 3, shall be carried as a separate line item.
- H. The AV Contractor shall specify the cost for a 2nd and 3rd year service contracts with pricing valid through the end of the 1st year contract.

1. Owner will not sign contracts for years 2 and 3 until satisfactory completion of Year 1 – pricing to remain valid.
- I. Additional terms – Warranty / Extended Service Options must include the following (at a minimum):
 1. Phone time to live agent: <60 seconds
 2. 1-hour Callback time
 3. Unlimited Remote Technical Support
 4. Emergency On-site Support: 4-hour SLA for calls received by 1pm
 5. Standard On-site Support:
 - a. 4-hour SLA for calls received by 1pm (First 6 months)
 - b. Next Business Day SLA After Month 6
 6. Unlimited Emergency and Standard Service Visits
 7. Year 1 to include 1 PM Visit
 8. Years 2 and 3 to include 2 PM Visits
 9. Equipment Repair – As per Manufacturer Warranties
 - a. However, all replacement parts to be overnighted or same-day when possible
 10. Video Conference Equipment – All Poly VC equipment to have supporting warranty and enhanced support provided
 11. Provide preferred Hourly Support Rates
 12. Provide pricing (alternate) for 3-month full time dedicated resource following system acceptance

1.10 PROJECT MANAGEMENT

- A. The AV Contractor shall provide a Project Manager to oversee and coordinate all activities on the Project
- B. Project Manager's Duties and Responsibilities:
 1. The AV Contractor shall provide to the Owner, as a part of the prefabrication submittal, the name of the Project Manager that will provide all duties and responsibilities as specified herein, during the term of the project.
 2. The Project Manager shall maintain the ability of making all managerial decisions on behalf of the AV Contractor on a day-to-day basis and shall retain the authority of accepting notices of deduction, inspection reports, payment schedules and any other project related correspondence on behalf of the owner.
 3. The Project Manager shall schedule and attend project management meetings, during which time all System related issues are discussed, scheduled, confirmed, and/or resolved.
 4. The Project Manager shall be available during normal business hours (0800 hours to 1700 hours) within two (2) hours by telephone during the term of the project.
 - a. After normal business hours, the Project Manager shall be available within four (4) hours by telephone during the term of the project.
 - b. In the event that the Project Manager is not available within the allotted time frame, the AV Contractor may designate another employee to temporarily act as the Project Manager in all correspondence with the Owner.
 - c. The AV Contractor shall ensure that any individual temporarily assuming the duties of the Project Manager is at equal or higher level in the AV Contractor's managerial chain of command.
 5. Upon notification by the Owner, of any project related installation issue, or issue that may contradict the Specifications as stated herein, the Project Manager shall respond to such issue, verbally and/or in writing within an eight (8) hour period

- a. Responses to such issues as stated above shall include a clear understanding of the issue, along with a tentative plan of action, reflecting milestones and/or deadlines to resolve the issue.
 - b. Where appropriate, based on the overall importance of the project issue, the Project Manager shall follow-up their initial response with a written response to the issue within 24 hours of identification of the issue.
- 6. On a PER ROOM BASIS and prior to the initiation of the Work, the Project Manager shall submit a schedule reflecting key milestones of the Work, including but not limited to the following:
 - a. Bid award
 - b. Kick-off meeting
 - c. Prefabrication submittal
 - d. Ordering, delivery, and installation
 - e. Shop Fabrication
 - f. Shop Acceptance Testing
 - g. Equipment delivery to Site
 - h. Project management schedule
 - i. Payment schedule
 - j. Site Installation Schedule inclusive of Hardware and Software
 - k. Systems training
 - l. Delivery of As-Built documentation
 - m. Delivery of Operations & Maintenance Manuals
 - n. Final System test
 - o. Acceptance of System
- 7. The Project Manager shall coordinate the schedule with overall project milestone dates as set by owner and CM. The Project Manager shall update the schedule on a weekly basis to reflect the status of each key milestone as the Work progresses.
- 8. As the System installation progresses, the Project Manager shall be capable of discussing any/or all of the above mentioned items at the request of the Owner, and shall address each item, as it relates to the current status of the Work.

1.11 SUBMITTALS

- A. Furnish submittals in accordance with general requirements specified in Division 1, and Construction Managers submittal procedures
 - 1. All submissions are to be processed via the CM and then forwarded to the A/E team for tracking and response purposes
- B. Prefabrication Submittals
 - 1. Submit pre-fabrication submittals in accordance with the Owner's construction schedule.
 - 2. Pre-fabrication submittals shall consist of product data, shop drawings, samples, and a detailed completion schedule. Partial submittals will not be accepted without prior written approval from the Architect.
 - 3. Pre-fabrication submittals shall be furnished in electronic formats as defined by the General Conditions under Part 1 of the Project Specifications.
 - 4. No portion of the Work shall commence nor shall any equipment be procured until the Architect has approved the pre-fabrication submittals in writing.
 - 5. A letter of transmittal identifying the name of the Project, AV Contractor's name, date submitted for review, shall accompany pre-fabrication submittals and a list of items transmitted.
- C. Product data required as part of the pre-fabrication submittal shall include the following:

1. Submit manufacturer's product data sheets for all materials and equipment proposed for use on the project sorted by room and indexed.
 2. Submit manufacturer's product data sheets for all fire stopping materials proposed for use on the project.
 3. Equipment schedules listing all System components, manufacturer, model number and the quantity of each
 4. General functional descriptions for each System
 5. Manufacturer's data specification sheets for all System components, including any warranty information.
 - a. Mark each product data sheet to show applicable choices and options (sheets containing more than one device or component model number shall be clearly marked to delineate items included in the Work)
 - b. Manufacturer's Data: For each manufactured device submit manufacturers' specifications and print photograph of the proposed device. Include engineering descriptions, principle of operation, application, and proposed model, style or size clearly indicated.
 6. A complete list of cable and wiring types, sizes, manufacturer, and model number
 7. A complete list of finishes and sample graphics, including custom art work and custom graphics (if applicable)
 8. List of parts inventory to provide manufacturer recommended service and maintenance of the Work
- D. Shop Drawings shall include the following:
1. AVC is required to supply fully dimensioned elevations and mounting details for all AV components within a space for client and consultant approval.
 - a. Compliance will require field measuring of spaces and comprehensive understanding of any existing equipment which is to be reused in the new system.
 - b. Compliance will require comprehensive understanding on existing and re-usable cable pathways
 2. Detailed plan views and elevations of AV Control and/or Head-end rooms (in addition to relevant telecommunications rooms) showing raceway, sleeves, cable tray, cable paths, equipment racks, equipment cabinets, termination blocks, power receptacles and grounding bus bars.
 3. Drawings to show evidence of coordination with other trades.
 4. Cable run sheets denoting cable type, signal type, termination type, cable number designation, start point and end point.
 5. Cable termination schedules showing cable transmission and device location. Provide schedules in printed and electronic format.
 6. Floor plan drawings indicating device locations with device legends
 7. System riser diagram with all devices, wire runs, conduit sizes required, and wire designations
 8. Schematic block diagrams for each System showing all equipment, interconnects, data flow, etc.
 9. Wiring diagrams for each subsystem defining the interconnection of all inputs and outputs for all equipment.
 10. Fabrication shop drawings for all custom equipment (if applicable)
 11. Plans and elevations of the Audiovisual equipment racks and/or custom furniture (including consoles, desks, and lecterns) quantifying all equipment to be mounted therein for review and approval by Owner.
 12. The AV Contractor shall submit samples of any equipment components upon request of the Owner.
 13. Samples submitted shall be the latest version of equipment.
 14. It is the responsibility of the AV Contractor to confirm all dimensions, quantities, and the coordination of materials and products supplied by the AV Contractor with other trades.

Approval of shop drawings containing errors does not relieve the AV Contractor from making corrections at their expense.

- E. Record Documentation shall include all information required in the Pre-fabrication Submittals but revised to reflect "as installed" conditions.
 - 1. General Description and Requirements
 - a. Submit Record Documentation in accordance with the CM's construction schedule.
 - b. Record Documentation shall consist of Record Drawings and Operation and Maintenance Manuals.
 - c. Provide a letter of transmittal with Record Documentation identifying the name of the Project, AV Contractor's name, date submitted for review, and a list of items transmitted.
 - d. Prior to the final acceptance of the Work, submit two draft sets of the Record Drawings portion of Record Documentation to the Architect. The draft copy shall be used during the final acceptance testing by the Architect.
 - e. Update all record documentation to reflect changes or modifications made during final acceptance testing as required and submit three blue/black lines and one reproducible set.
 - f. Provide cable test results for all cables installed under this Work, tested and documented as described herein.
 - g. Provide Owner with Operation and Maintenance Manuals including wiring diagrams, parts lists, shop drawings and manufacturers' information on all equipment and cables provided by the AV Contractor. Manuals shall be provided in a high quality, 3-ring binder and completely indexed.
 - h. Provide Owner with all systems programming on electronic media. All programming and source code is to be considered as a work for hire and will be the property of the Owner upon completion of the project. All code must be provided uncompiled.
 - 2. Record Drawings
 - a. Produce all Record "as-built" Drawings using the latest version of AutoCAD. Record drawings shall, at a minimum, include the following:
 - 1) Floor plan drawings indicating device locations, with device legends indicating manufacturers and model numbers for each device
 - 2) Floor plan drawings indicating wire routing, wire routing shall be delineated in straight line runs and be tagged with cable identification and terminal strip numbers to coincide with the installation
 - 3) Mounting details for all equipment and hardware
 - 4) Functional block diagrams for each subsystem
 - 5) Wiring details showing rack elevations, equipment wiring and terminations, and inter-rack wiring
 - 6) Wiring diagrams for all custom circuitry including interfaces to various control output controlled devices, lighting control interfaces, projection screens, operable window treatments, motorized doors/partitions, etc.
 - 7) Wiring diagrams for each System, wiring diagrams shall be identical to those laminated and located within the door of the equipment room where the subject equipment racks are located.
 - 8) Typical point-to-point wiring diagrams for each piece of equipment and groups of equipment within the System
 - 9) Layout details for each riser location, including Audiovisual panels, power supplies, junction boxes, conduit, and any other Audiovisual related equipment
 - 3. Operation and Maintenance Manuals
 - a. Operation and Maintenance Manuals shall apply to all Audio Visual related devices, equipment and software modules.
 - b. Operation and Maintenance Manuals shall be formatted as follows:
 - 1) Bind each manual in a hard-back loose-leaf binder.
 - 2) Identify each manual's contents on the cover.

- 3) Provide a table of contents and tabulated sheets for each manual. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix if applicable.
 - 4) Any hardware manual demonstrating more than one model number of device on any one page shall be clearly marked as to delineate which model has been implemented in the Work.
- c. Operation and Maintenance Manuals shall include, at a minimum, the following:
- 1) Operational description of each subsystem
 - 2) Detailed programming descriptions for each subsystem
 - 3) Explanations of subsystem interrelationships
 - 4) Electrical schematics for each piece of equipment specified
 - 5) Power-up and power-down procedures for each subsystem
 - 6) Description of all diagnostic procedures
 - 7) A menu tree for each subsystem
 - 8) Setup procedures for each component of the subsystems
 - 9) A list of manufacturers, their local representatives, and subcontractors that have performed Work on the Project
 - 10) Installation and service manuals for each piece of equipment
 - 11) Maintenance schedules for all installed components
- d. Operation and Maintenance Manuals shall include a separate section for each software program incorporated into the Project. The software section shall include, at a minimum, the following information:
- 1) Definitions of all software related terms and functions
 - 2) Description of required sequences
 - 3) Directory of all disk files
 - 4) Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer
 - 5) Instructions for manufacturer supplied report generation
 - 6) Instructions for custom report generation
 - 7) Database format and data entry requirements
- F. Procedure for Resubmitting
1. Make corrections or changes in O & M and/or Record Drawings as required by the Architect and resubmit when the Architect's stamp requires re-submittal.
 2. Clearly identify changes made other than those specifically requested by the Architect when resubmitting Record Drawings. Changes shall be clouded or similarly highlighted as coordinated with the Architect. Only changes that have been specifically requested by the Architect or have been clouded by the AV Contractor will be reviewed on resubmittals.
 3. Any drawing sheets added to the resubmittal shall be clearly identified and clouded, and shall not change the sheet numbering scheme for previously issued Record Drawings.
 4. The AV Contractor shall be responsible for any delays caused by the re-submittal process.
 5. Re-submittal Review Fees
 - a. If the Architect rejects the AV Contractor's Record Submittal (Rejected, Revise, and Resubmit) more than two times, the Architect will be compensated for all subsequent reviews, whether partial or comprehensive. The amount of such compensation will be incorporated by Change Order and withheld from the AV Contractor's Application for Payment.
- G. Status Reports
1. After the award of contract, the AV Contractor is responsible for providing weekly status reports outlining his progress on the project. These reports should include information on the work completed during the week, the work to be completed during the upcoming week and any potential scheduling issues. The following should be included in this Status Report:

2. Expected date of project submittals, including equipment cut sheets, shop drawings, control system interface designs, etc.
3. Anticipated completion date and percentage complete of in-house rack fabrication and testing, prior to shipping to the job-site.
4. Anticipated completion date and percentage complete of control system programming, prior to shipping to the job-site.
5. Schedule and percentage complete of on-site wiring and supervision.
6. Schedule and percentage complete of on-site installation.
7. Schedule for owner training.
8. Schedule for systems checkout and turnover to the Owner.

1.12 QUALITY ASSURANCE

- A. Installer Training Process: – AV Contractor's labor force shall have certified installers who attended training programs of the proposed system preparing them to perform the work.
- B. The Installer for this Project is to be certified by all manufacturers of the installed equipment that the AV Contractor proposes.
- C. Registered and Certified supervisors- AV Contractor must have all supervisory personnel certified for the type of work they are overseeing (installation and design) from Infocomm International (CTS-I/D)
- D. The AV Contractor shall also have personnel on staff and available to work on this project with the following Certifications:
 - E. Cisco CCNA – Routing & Switching
 - F. Microsoft MCSE - Productivity
- G. In addition, for any projects employing wireless data, the AV Contractor shall also have personnel with the following certifications:
 - H. Cisco CCNA – Wireless
 - I. Microsoft MCSE - Mobility
- J. Quality assurances for audio visual systems includes a multi-step program consisting of pre-qualification procedure for manufacturers and installation specialists; products phase; installation; operating instruction and training; and the submission of maintenance and operating manuals.
- K. The AV Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the Work.
- L. By submitting a bid, the AV Contractor thereby certifies that it is qualified in all areas pertaining to, directly or indirectly, the Work. In the event the AV Contractor becomes unable to complete the Work in accordance with the Contract Documents, or the satisfaction of the Owner, it shall be the responsibility of the AV Contractor to retain the services of applicable manufacturers' representatives to expeditiously complete the Work in accordance with the Owner's construction schedule with no additional cost to the Owner.

- M. The AV Contractor shall provide factory-certified technicians to install, commission, and maintain the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.
- N. The AV Contractor shall ensure compliance with, and have a thorough understanding of, all local codes and contract conditions pertaining to this Project.
- O. The AV Contractor shall maintain an inventory of spare parts and other items critical to System operation and as necessary to meet the emergency service requirements of this Project.
- P. Product Standards
 - 1. All equipment and materials for contained herein shall be the products of recognized manufacturers and shall be new.
 - 2. New equipment and materials shall:
 - a. Be Underwriters Laboratories, Inc. (U.L.) listed and approved where specifically called for; or where normally subject to such U.L. labeling and/or listing services.
 - b. Be without blemish or defect.
 - c. Be products that meet with the acceptance of the agency inspecting the Audio Visual Systems work.
 - 3. It is the intent of these specifications that wherever a manufacturer of a product is specified, and the terms "other approved" or "approved equal" are used, the substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction. Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance.
 - 4. Substituted equipment or optional equipment, where permitted and approved, must conform to space requirements. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the AV Contractor's expense. Any modifications of related Systems as a result of substitutions shall be made at the AV Contractor's expense.
 - 5. The approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not ensure that the Audiovisual Consultant, Architect, or the Owner attests to the dimensional accuracy, dimensional suitability of the material, or mechanical performance of equipment. Approval of shop drawings does not invalidate the Drawings and Specifications.
 - 6. Substitutions of equipment shown on the schedules or designated by model number in the specifications will not be considered if the item is not a regular catalogued item carried by the manufacturer.
 - 7. Within the Specifications, certain manufacturers have been listed. These manufacturers are listed for example purposes (unless followed by "No Exceptions"). The AV Contractor may substitute manufacturers and models that may be more cost effective or readily available than that specified. However, all substitutions shall meet or exceed the specified functional and technical requirements. Acceptance of such substitutions is at the discretion of the Consultant and/or Owner.

1.13 Owner Furnished Equipment

- A. The AV Contractor shall be responsible for obtaining any new or existing OFE equipment from the Owner. Existing equipment shall be brought back to the AV Contractor's facility where they shall ascertain that the OFE equipment is performing at or above factory specifications.
- B. If existing equipment is not operating "as-new", or is missing accessories necessary to be properly integrated with the rest of the system as intended, the AV Contractor shall provide a

proposal, including a time line, for returning the equipment to “as-new” condition, provide the needed accessories, arrange to have the owner replace equipment, or submit a proposal for replacement or alternative equipment.

1.14 Owner Furnished Data Network

- A. For audiovisual systems that make use of an owner furnished network, the AV Contractor shall determine the following:
 - 1. Is the network existing, or will it be built new
 - 2. If it is to be new, what is the schedule to make it useable so that the AV Systems can be deployed and tested in a timely fashion.
- B. The AV Contractor shall co-ordinate with the Owner to obtain details of the data network, and shall verify that sufficient network connectivity (both passive “infrastructure” and active switch ports with adequate bandwidth etc.) will be provided for the AV Systems to operate correctly.
- C. The AV Contractor shall further co-ordinate with the Owner to verify compatibility/interoperability between that Owner’s data network and the audiovisual systems, and shall identify in writing any potential deficiencies or areas of concern, prior to commencing on-site installation.

1.15 USER TRAINING

- A. The Contractor shall provide on-the-job training by a suitably qualified instructor, to personnel designated by the Owner, to instruct them in the operation and maintenance of the systems. In the event the Contractor does not have qualified instructors on staff for certain sophisticated equipment, the contractor will provide a manufacturer’s representative for such instruction to the owner at no additional cost. All training shall take place after the systems are operational and accepted. There shall be a minimum of 80 hours, of end-user training included in these specification durations to be specified by Owner. Owner is to retain 10% of contract fee until completion of acceptance.

1.17 PUBLICATION

- A. No information relative to the project or work, whether covered in this specification or otherwise may be released for publication without prior written consent and approval from the owner.

1.18 INFORMATION TO BE SUBMITTED WITH THE BID RETURN

- A. AV Contractor Qualifications
 - 1. Work specified herein shall be the responsibility of a single Audio Visual Systems AV Contractor. Bid submission shall document a minimum of five (5) years' experience in the fabrication, assembly, and installation of Systems of similar technology, complexity and size as the project specified herein. The documentation submitted shall include 3 verifiable references of projects within the last 3 years. Specific information to be provided shall be:
 - a. Location
 - b. Owner (inclusive of contact information)
 - c. Construction Manager (inclusive of contact information)
 - d. Audiovisual Consultant (inclusive of contact information)
 - e. Date of Project initiation
 - f. Date of Project Completion
 - g. Contract Value (Contractors Value)
 - h. Is there a Service Contract in place Duration
 - i. Current relationship with owner/users
 - 2. Indication of Microsoft Teams and Poly certifications
- B. Equipment Costs:
 - 1. The bid return shall include detailed lists of all equipment to be supplied. Each piece of equipment shall be individually priced. An itemized listing is provided in Appendix A, Audiovisual Bill of Materials attached to this specification.
 - 2. In the event that the equipment list spreadsheet is made available to the bidders electronically, Shen Milsom & Wilke, LLC. is not responsible for any formulas that may be resident in the spreadsheet. The results of any calculations in the spreadsheet are the sole responsibility of the Bidder.
 - 3. Equipment costs shall reflect all required modifications and accessories. All substitutions for specified equipment shall be listed and individually priced on a separate page.
 - 4. Itemized equipment pricing submitted with bid returns shall also represent unit pricing for components should additions to systems requirements change after contract award.
 - 5. Equipment totals from each equipment list shall be entered in the Master Recapitulation of Costs form.
- C. Non-Equipment Costs.
 - 1. Non-equipment costs shall be furnished separately on the Master Recapitulation of Costs form. These non-equipment costs shall be detailed for each of the following categories:
Engineering: Including all required designs, drawings, run sheets, instruction manuals, etc.
 - 2. Pre-installation: Including all fabrication, modification, assembly, rack wiring, etc., performed on the Contractor's premises.
 - 3. Installation: Including all on-site installation and wiring, coordination and supervision, testing, checkout, Owner training, etc. performed on the Owner's premises.
 - 4. General and Administrative: Including all G&A expenses, shipping, insurance, and guarantees.
 - 5. Taxes (if any are applicable).

1.19 ADMINISTRATIVE/STAFFING

- A. Describe your companies administrative organizational structure, including:
 - 1. Number of years in business.
 - 2. Core business
 - 3. Staff/headcount
 - a. Resumes of key personnel. Resumes must reflect skills relating to audio, video, teleconferencing (audio and video), networked audio, networked video, videowalls, videowall processors, control centers, mission critical facilities integrated control systems, programming, project management, etc. Resumes must be submitted for those individuals who will actually be assigned to this project and must include all training background information and certificates (i.e., technical product and ICIA). Upon award of contract, those personnel assigned to the project may NOT be changed without the written approval of the owner
 - b. Locations of all staffed and operational offices complete with the number of technical support personnel in each office and geographic area of coverage.
 - c. Identify area of servicing expertise by staff member inclusive of all relevant manufacturer training and certifications.
 - d. Identify the nearest service facility to this installation site and describe how you approach field service requests. Consider a requirement for an emergency 4 hour on-site response time as well as normal field service requests.
- B. Sub-Contracting/Teaming
 - 1. The AV Contractor must state if they intend to utilize a subcontractor in a systems servicing support role and provide said subcontractor's name and address and technical qualifications with the bid return as noted above. The subcontractor shall comply with all the same rules, regulations, laws and codes, licenses, etc. as required by the AV Contractor and as specified herein. The Owner reserves the right to approve or disapprove any subcontractor proposed by AV Contractor.
 - 2. If the Bidder proposes to subcontract any portion of the system installation work, any such subcontractors shall be clearly identified and their responsibilities and qualifications detailed in the Bidder's bid submission. Any and all work performed by a subcontractor shall be considered fully as part of the primary Bidder's contract and responsibility.
 - 3. For each proposed subcontractor, the bid must include at least three client references, with contact names and phone numbers, for comparable projects accomplished by those subcontractors.
 - 4. If it is the intent of the Bidder to "team" with one or more additional AV contractors, then this must be clearly stated and so identified in the Bidder's bid return. The AV Contractor (Bidder) who is returning the bid shall be considered as the "prime" with respect to these circumstances, and will assume and accept full responsibility for the performance of all members of the "team," including themselves and all other subcontractors engaged in the performance of the contract.
 - 5. Work specified herein shall be the responsibility of a single Audio Visual Systems AV Contractor. Bid submission shall document a minimum of five (5) years' experience in the fabrication, assembly, and installation of Systems of similar complexity as specified herein. The Systems are defined as combination of audio, video, AV control, systems programming (of AV devices) and network interface which are to encompass all system types as specified in this document. The documentation shall include the names, locations, points of contact and DETAILED descriptions for at least three (3) installations of the type and complexity specified herein.
 - 6. The AV Contractor warrants that both they and their subcontractors are licensed as required by the authorities having jurisdiction and as required by local ordinances.
- C. User Serviceability & Service Training

1. Define and identify specifically what equipment and equipment components can be field repaired/replaced by the users and at what level of manufacturer provided training is required.
2. The bidder should provide a list of recommend spares and quantities, providing part numbers and unit costs as appropriate for all critical components and Sub-Systems

1.20 EXCEPTIONS AND PROPOSED MODIFICATIONS

- A. Should the Bidder wish to propose recommendations that will enhance the performance of the audiovisual system(s), or reduce costs without loss of performance, such comments shall be made in the bid submissions. All suggestions that are of value to the Owner shall be taken into consideration in the evaluation of bid returns. All such proposals shall be made as "alternate(s)", with the appropriate cost modifications clearly shown separate and apart from the costs of the system "as specified."
- B. Any and all exceptions to specifications, related drawings, general conditions and terms & conditions must be made with the bid submission. In the absence of exceptions, these specifications and related drawings shall be binding in letter and intent upon the successful Bidder. It is further required, and the Owner shall expressly rely on the fact, that the Bidder has examined all designs and specifications in detail and is prepared to accept full responsibility for the performance of the complete system installation as designed and specified. It is further required, and the Owner shall expressly rely on the fact, that the Bidder has reviewed and accepted current site conditions.

1.21 SUBSTITUTIONS/ALTERNATE EQUIPMENT & SOLUTIONS

- A. All bids and equipment shall be submitted on the basis of the equipment list that is included as part of this specification. All specified equipment should be considered to be "or approved equal" unless specifically noted herein. The Bidders are invited to propose alternate equipment/solutions. However, all such proposals shall be submitted separately and will be identified as "alternate(s)" with equipment costs shown as separate and apart from the costs of the equipment "as specified."
- B. Proposals for alternate equipment or /solutions will receive careful and equitable consideration if differences do not result in a departure from the overall intent of the system design and operation, and are demonstrated to be in the best interests of the User.
- C. All such proposals for alternate equipment/solutions shall be submitted at the time of Bid Return and accompanied by complete technical information, systems drawings and specifications, and "cut-sheets" for the equipment so proposed. The Bidder shall identify any and all substantive differences between the "alternate" and "specified" equipment.

PART 2 - PRODUCTS

2.1 DETAILED SPECIFICATIONS – OPERATIONAL SUMMARY

- A. General Programming Requirements
 1. Primary room capabilities are dictated by UC platform running on Poly or hardware. It is expected that Day 1 will be operating with a page flip between Microsoft Teams and BYOD mode.

2. For rooms with audio DSPs and mic muting functions:
 - a. All mics to mute together with codec mute state sync and mic mute indicators to track
- B. BYOD mode to be made available where supported by the hardware
- C. Room-By-Room Programming Requirements
 1. Digital Signage - Room 212
 - a. Display:
 - 1) 65" Flat Panel display
 - b. Video sources:
 - 1) TVs to have cable at each location with control via handheld remote.
 - 2) Media Player to be mounted behind display for signage (content and management by others)
 - c. Audio:
 - 1) Built-in display speakers
 2. Study Rooms 201, 202, 209, 210, 211
 - a. Display:
 - 1) 55" Flat Panel Display
 - b. Video Source:
 - 1) OFE PC
 - 2) Wireless sharing appliance
 - 3) HDMI & USB Laptop input (located on wall at tabletop height)
 - c. Audio:
 - 1) Internal display speakers.
 - d. Videoconferencing:
 - 1) Logitech Meetup All in one camera sound bar.
 - e. Control:
 - 1) Push button panel on display wall adjacent to the display.
- D. Training / Support Materials
 1. AVC shall provide comprehensive single page quick start guides that are printed and laminated.
 - a. This document will outline common use operations as well as simple trouble shooting steps
 - b. (3) revisions within the first year of installation should be planned to document changes in programming or improved documentation based on end-user feedback.
 2. AVC shall create comprehensive operations manuals for the systems providing for more advanced troubleshooting steps for system failures as well as to document more advanced operations of the system, specifically the larger auditoriums.
 - a. Part 1 outlines additional operations manual requirements.

2.2 AUDIOVISUAL EQUIPMENT LIST

- A. See the attached, detailed equipment lists for the audiovisual systems. These lists are provided for the purpose of soliciting bids. The bidders are responsible for supplying all equipment necessary to provide complete and working systems, whether the equipment is specifically enumerated herein.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine the areas to receive the work and the conditions under which the Work would be performed. AV Contractor shall remedy conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General
 - 1. Installation shall include the delivery to the installation site, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required, interconnecting wiring of the system components, equipment alignment and adjustment, programming and configuration and all other work whether or not expressly required herein which is necessary to result in complete and fully operational systems.
 - 2. Prior to ordering equipment, the contractor shall coordinate the frequencies of all wireless devices to prevent unwanted interaction between devices and rooms. This includes, but is not limited to, wireless microphones, assisted listening system devices, wireless control panels, etc.
 - 3. All accessories, including rack mounting hardware, power supplies, etc., shall be obtained from the original equipment manufacturer. Unless otherwise noted or specified, third party accessories shall not be used.
 - 4. If, in the opinion of the Contractor, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the Design Team. Modifications shall not commence without written approval from the Design Team
 - 5. During the installation, and up to the date of final acceptance, the Contractor shall be under obligation to protect his finished and unfinished work against damage and loss. In the event of such damage or loss, the damage shall be replaced or repaired at no cost to the Owner.
- B. Physical Installation
 - 1. All equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
 - 2. All equipment shall have an engraved plaque permanently affixed, denoting its function.
 - 3. Fastenings and supports shall be adequate to support their loads with a safety factor of at least three. All boxes, equipment, etc., shall be secured plumb and square.
 - 4. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.
 - 5. Trim and Escutcheon Components
 - a. To insure a proper finished appearance, the AV Contractor shall furnish and install trim/escutcheon components at all conditions where A/V components pass through the finished ceilings. This would include but not be limited to video projector supports, television monitor/receiver supports and any other component which is not specifically supplied with integral flanges/trim components; i.e. speaker mounts, assistance listening devices, etc.
 - b. The visible component of any trim should be minimal in size, preferably no wider than 1/2". All trim components at the ceiling plane shall be finished to match the approved ceiling finish. The audiovisual contractor should obtain a sample from the General Contractor, including any custom color information, or standard color numbers.

- c. All visible components and finish options shall be submitted to the Design Team for review and approval prior to fabrication.

C. Cable Installation

1. All wire bundles are to be neat and combed free of cable crossovers.
2. All cables, regardless of length, shall be marked with a permanent, self-laminating wrap-around number or letter cable marker at both ends, similar to the Panduit "Pan-Code" system. Labels must be computer-generated for legibility. Wire labels done by hand in the field must be replaced with computer generated labels. There shall be no unmarked cables at any place in the system. Marking codes used on cables shall correspond to codes shown on drawings and or run sheets. All labeling must be reviewed and approved by Owner prior to installation as part of the shop drawing process.
3. All cables shall be grouped according to the signals being carried. In order to reduce signal contamination, separate groups shall be formed for the following cable families:
 - a. Power cables
 - b. Control cables
 - c. Video cables
 - d. Audio cables carrying signals less than - 20 dBm
 - e. Audio cables carrying signals between - 20 dBm and +20 dBm
 - f. Audio cables carrying signals above +20 dBm
4. As a general practice, all power cables, control cables, and high level cables shall be run on the left side of an equipment rack as viewed from the rear. All other cables shall be run on the right side of an equipment rack, as viewed from the rear.
5. Cables ties shall be placed at appropriate intervals of no greater than six inches for vertical bundles, two inches for horizontal bundles.
6. All vertical cable bundles shall be attached to the rack frame.
7. All cables shall be continuous lengths without splices. All system wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. Except where noted otherwise in the specifications, NO BARE WIRE TERMINATIONS WILL BE ACCEPTED. Heat-shrink tubing shall be used to insulate the ground or drain wire. Unused wires at the end of a cable shall remain unstripped and shall be laid back and held in place with wire ties.
8. All solder connections shall be made with rosin-core solder using temperature-controlled solder stations. Care shall be taken to avoid cold or cracked solder joints. Any connections that do not appear to be clean and shiny, or which show signs of cracking, shall be resoldered by the contractor before final acceptance of the system.
9. Mechanical connections using insulated, crimp-type connectors shall be bonded to the connector by soldering the wire to the metal part of the connector.
10. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 1/4 inch of insulation from the stranded conductor. Then the un-tinned wire shall be inserted into the terminal and the screw tightened using a secure fitting precision screwdriver.
11. Terminal blocks, boards, strips or connectors shall be furnished for all cables which interface with racks, cabinets, consoles, or equipment modules. No audio cables shall run directly to the audio patch panel jacks. Each audio patch panel shall be furnished with an audio terminal block, and all audio cables to and from the audio patch panel shall terminate on this block.
12. All wire markers shall face a common direction.
13. All cables shall have proper connector housing.
14. Cables shall not protrude from the back of racks.
15. All cable entry shall be through the tops of racks or through entrance holes in the base of the rack. No cable shall enter racks through front, rear or side panel openings.
16. Unless otherwise called for in these specifications and drawings, the following cables, or their approved equals, shall be used in these systems:

Type	Manufacturer	Non-Plenum	Plenum
RF-CATV (Horizontal-RG6)	Belden	1189A	1189P
RF-DBS/DSS (Horizontal-RG6)	Belden	1829A	1829P
RF-CATV (Vertical-RG11)	Belden	1617A/7731	1153A
RF-50 Ohm (Horizontal RG-8)	Times Microwave	Microwave	LMR400
Video (Baseband & SDI)	Belden	1505A	1506A
S-Video	Belden	1807A	7700A
Control (4 conductor shielded)	Belden	1502R	1502P
Control (12 conductor shielded)	Belden	9556	6309FE
Audio	Belden	9451/1266A	9451P
Audio (8 Ohm program speakers)	Belden	8473	1861A
Audio (70 Volt Speaker)	Belden	8461	1863A
Video, RGB (RG6)	Belden	7721A	None
Video, RGB (RG59)	Belden	7796A	1826A
Multi-Channel Audio	Belden	8774	88778
Digital Audio (110 Ohm)	Belden	1800B	1801B
4-Fiber Riser Cable Tight-Buffered 50 μ m multimode (OM3)	Corning Cable Systems		004T88-31180-29
Category 6e	Berk-Tek		LANmark-1000 Enhanced Category 6 UTP
Category 6	Berk-Tek		LANmark-6 CAT 6 UTP Plenum
Category 5e	Berk-Tek		LANmark-350 Prem. Cat 5e

- D. Note: These cable types are cited to illustrate the type and quality of cable required. Unless otherwise noted, cables from other manufacturers, i.e. Canare, Crestron, CommScope, Extron, Gepco, Liberty, etc. will be considered if data sheets indicating equivalency are submitted to Consultant for approval prior to installation.
1. It is the responsibility of the Audiovisual Contractor to verify, furnish and install the correct CATV cable type and connectors, as per the local CATV provider.
 2. Unless otherwise noted, all video and computer video cables are to be terminated using seventy-five ohm (75 Ohm) connectors, with a captive center pin.
 3. Cables running in plenum areas without conduit shall be plenum rated cable, and match the specified cable above. It is the responsibility of the Bidder to inspect the electrical drawings, and verify in what spaces plenum cable shall be used. No claims for additional monies, based on the use of plenum cable, will be allowed.
 4. All cables that can be terminated in the field (except video and pulse cables, which must be cut to an electrical length) shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior permission of the Consultant. For equipment mounted on casters, in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length.
 5. No cable shall be installed with a bend radius less than that recommended by the cable manufacturer.

6. Where cables are installed in architectural niches, ensure that the cables are black, unless otherwise directed, to reduce visibility from the audience.
7. Where cables are visible, the cables will be sheathed in a color wrap that has been submitted for approval by the Design Team.

E. CABLE SEPARATION

1. Cable separation of cables for runs greater than 24'.
 - a. Microphone Level – 12" from all other circuits.
 - b. Line Level and Control – 12" from any circuit with signal of 20dB or greater than Line Level and Control cables.
 - c. Speaker level circuits – 12" from other circuits.
 - d. Video and Data – 12" from any circuit with signal of 20dB or greater than Video and Data.
 - e. AC Power Circuits – 12" from all other circuits.
 - f. Required conduit separation are given for all audiovisual pathways on plans

F. CABLE SUPPORT

1. Supporting method in accordance with Section 26 05 00
2. Individual runs throughout building – Support cable at 600mm on center and 100mm at any change in direction. Support from building structure. Cables on top of ceiling tiles will be rejected. Cable supported by ceiling grid support wires will be rejected.
3. Cable Bundles – Where multiple cable combine support at 300mm on center and 100mm at any change in direction. Support from building structure. Cables on top of ceiling tiles will be rejected. Cable supported by ceiling grid support wires will be rejected.

G. RACK CABLING

1. Neatly train and lace cables.
2. Route Cables from components to lacing bars installed on rear rack rail.
3. Provide services loops for each cable.
4. Cable separation of cables for runs within Equipment rack.
 - a. Microphone Level – 50mm from all other circuits.
 - b. Line Level and Control – 50 mm from any circuit with signal of 20dB or greater than Line Level and Control cables.
 - c. Speaker level circuits – 50mm from other circuits.
 - d. Video and Data – 50 mm from any circuit with signal of 20dB or greater than Video and Data.
 - e. AC Power Circuits – 50mm from all other circuits.

H. APPROVED WIRE TERMINATION MEANS

1. Solder Connections – For connectors utilizing Solder Cups
2. Terminal strip Connectors – For termination of blunt cut cables, cable to be tinned prior to termination
3. Multi Pin connectors – Utilize connector manufacturers crimper
4. Crimp Cap Terminations – For Loudspeaker circuits at individual devices. Distribution cable termination to utilize terminal strip connectors.

I. CONNECTION PLATE RECEPTACLES (unless otherwise specified)

1. All connection plate receptacles must be labeled properly according to Owner approved labeling scheme.
2. Audio (microphone or line level) – XLR type.
3. Audio (loudspeaker level) – Neutrik Speakon□.
4. Intercom – XLR or □ inch diameter tip/ring/sleeve type, or as required by the intercom system. Jack shall be insulated from panel type.
5. Video – BNC type.
6. VGA – DB-15HD jack, isolated from panel type, with hex nuts

7. DVI (Inclusive of DVI-A, DVI-I and DVI-D signal types) – DVI-I type connector unless otherwise specified.
8. HDMI – HDMI with locking nut.
9. USB – USB Type A
10. Category 5/6 – RJ45 Type
11. RF – “F” type. Receptacles shall be insulated from panel type.
12. Note: All connectors on wall plates, or in other exposed locations, are to be recessed.

J. PATCH PANELS

1. Patch Panel Assignments
 - a. All patch panels shall be wired so that signal “sources” (outputs from) appear on the upper row of a row pair; and all “loads” (inputs to) appear on the lower row of a row pair.
2. Patch Panel Designation Strips
 - a. All audio and video patch panel designation strips shall utilize alphanumeric identifications and descriptive information. The jack position in each horizontal row shall be numbered sequentially from left to right. The horizontal jack rows shall be lettered sequentially from top to bottom. The alphanumeric identification of each jack shall be included on the functional block drawings, as well as on reproductions of these drawings, which shall be mounted in an appropriate location near the patch bays.

K. MOUNTING HEIGHTS

1. Coordinate locations of the following with mounting heights as indicated on Architectural, Electrical and Audiovisual drawings.
 - a. Technical wall plates
 - 1) AV input/output connections
 - 2) Flat panel display panel connections
 - 3) Video projector connections
 - 4) Annotation panel connections
 - 5) Networked Digital Clocks
 - 6) PTZ cameras
 - 7) Wall mounted speaker boxes
 - b. Control panels
 - c. Pull boxes
 - d. Other devices as required

L. Grounding Procedures

1. In order to minimize problems resulting from improper grounding, and to achieve maximum signal-to-noise ratios, the following grounding practices shall be adhered to in order to maintain the integrity of the grounding system:
 - a. General
 - b. Because of the great number of possible variations in grounding systems, it shall be the responsibility of the Contractor to follow good engineering practice, as outlined below, and to deviate from these practices only when necessary to minimize crosstalk, ground loops, ground-induced noise, and to maximize signal-to-noise ratios in the audio, video, and control systems.
 - c. System Power Ground: A single primary “system ground” shall be established for the system in each particular area. All grounding conductors in that area shall connect to this primary system ground.
 - 1) The system ground shall be provided at the audio equipment rack for the area, and shall consist of a copper bar of sufficient size to accommodate all secondary ground conductors. A copper conductor having a maximum of 0.1 Ohms total resistance shall connect the primary system ground bar to the nearest approved ground. The Contractor shall be responsible for determining if the metallic conduit is properly electrically bonded to the building ground system.

- 2) Secondary system grounding conductors shall be provided between all racks, audio consoles, and audiovisual system equipment local to the area. Each of these grounding conductors shall have a maximum of 0.1 Ohms total resistance.
 - 3) Under no conditions shall the AC neutral conductor, either in the power panel or in a receptacle outlet, be used as a system ground, except as specifically defined by NFPA 70 for bonding.
 - 4) Ungrounded equipment with either an inline transformer or a 2-prong plug, shall be bonded to the rack bus bar using #12awg cable.
- d. Audio Cable Shields
- 1) All audio cable shields shall be grounded at one point only. There are no exceptions. For inter and intra-rack wiring, this requires that the shield be connected at one end only. For ungrounded portable equipment, such as microphones, the shield shall be connected at both ends but grounded at only one end.
- e. Video Receptacles
- 1) All video receptacles that are provided and installed by the Contractor shall be insulated from the mounting panel, outlet box, or wireway. Unless otherwise detailed herein, this shall be accomplished by using insulated-from-panel type receptacles.
- f. Audio Receptacles
- 1) All audio receptacles that are provided and installed by the Contractor shall be insulated from the mounting panel, outlet box, or wireway. Unless otherwise detailed herein, this shall be accomplished by using insulated-from-panel type receptacles.
- g. General
- 1) Because of the great number of possible variations in grounding systems, it shall be the responsibility of the AV Contractor to follow good engineering practice, as outlined above, and to deviate from these practices only when necessary to minimize crosstalk and to maximize signal-to-noise ratios in the audio, video, and control systems.

3.3 PERFORMANCE STANDARDS

- A. Unless restricted by the published specifications of a particular piece of equipment, or unless otherwise required under the Detailed Specifications, the following performance standards shall be met by each system. The signal paths for the above Performance Standards shall be as follows: From all source inputs to all signal destinations. See Contractor System Checkout Section III-T for testing procedures.
1. Analog Audio
 - a. Frequency Response Within plus or minus 0.5dB, 20 Hz to 20,000 Hz
 - b. Signal to Noise Ratio greater than 90dB
(including crosstalk and hum at all input/output levels)
 - c. Total Harmonic Distortion 0.05% maximum from 20 Hz to 20,000 Hz.
 - d. Input Levels
 - e. Microphone (Nominal) -50dbu
 - f. Overload (Minimum gain) -5dbu
 - g. Maximum Gain -26dbu
 - h. Line (Nominal) +4dbu
 - i. Overload (Minimum gain) +24dbu
 - j. Maximum Gain +9dbu
 - k. Input Common Mode Rejection >100db
 - l. Output Levels

- m. Line (Nominal) +4dbu
- n. Maximum +24dbu
- o. Output Impedance < 0.5 Ohms
- p. Load Impedance >150 Ohms
- 2. Analog Video (signal)
 - a. Frequency Response Within plus or minus 0.5dB, DC to 4.2 MHz
 - b. Signal to Noise Ratio 55 dB minimum unweighted, (peak to RMS) DC to 4.2 MHz
 - c. Crosstalk 45 dB minimum unweighted DC to 4.2 MHz
 - d. Line and Field Tilt: 2% maximum
 - e. Differential Gain: 3% maximum
 - f. Differential Gain: 2 degrees maximum
- 3. SDI – Per SMPTE 259M
- 4. HD SDI – Per SMPTE 292M
- 5. HD SDI (Dual Link) – Per SMPTE 424M
- 6. 3G SDI – Per SMPTE 424M
- 7. HDMI – Per HDMI Ver. 1.3b
- 8. DVI – Per DVI Ver. 1.0
- 9. Analog NTSC Video
- 10. COMPOSITE VIDEO SIGNAL
 - a. Signal 1V P-P 75 Ω (3.58, 4.43MHz) NTSC, PAL, or SECAM as appropriate
- 11. S-VIDEO SIGNAL
 - a. Signal Y: 1.0V p-p, 75 Ω C: 0.286V p-p, 75 Ω (3.58, 4.43MHz) NTSC, PAL, or SECAM as appropriate
- 12. COMPONENT VIDEO (Beta Component)
 - a. Signal Y: 1.0V p-p, 75 Ω PB/CB: 0.7V p-p, 75 Ω PR/CR: 0.7V p-p, 75 Ω
- 13. RF Broadband
 - a. The RF Broadband system shall meet or exceed the published standards of the following organizations:
 - 1) FCC Part 15 Rules and Regulations: Radio Frequency Devices
 - 2) FCC Part 76 Rules and Regulations: Cable Television Service
 - 3) NCTA-02 Recommended Practices for Measurements on Cable Television Systems.
 - b. Visual Carrier Level +7 +/- 3dBmV for each tap at channel WW(433.25 MHz)
 - c. Visual Carrier Level +5 +/- 3dBmV for each tap at channel 2(55.25 MHz)
 - d. Visual Carrier to Noise Ratio 42 dB minimum on any channel (4MHz bandwidth)
 - e. Maximum Loss from common 45 dB or less point to any tap at channel WW(433.25 MHz)
 - f. Maximum Loss from common 37 dB or less point to any tap at channel 2(55.25 MHz)
- 14. Audio Video Bridging (AVB)
 - a. IEEE 802.1AS: Timing and Synchronization for Time-Sensitive Applications
 - b. IEEE 802.1Qat: Stream Reservation Protocol (SRP)
 - c. IEEE 802.1Qav: Forwarding and Queuing for Time-Sensitive Streams
 - d. IEEE 802.1BA: Audio Video Bridging Systems
- 15. Cobranet Audio
 - a. Protocol not subject to performance-based substitution.
- 16. Dante Audio
 - a. Protocol not subject to performance-based substitution.
- 17. Audiovisual System, Control System and User Interface Programming
 - a. Control system user interfaces pages and programming shall be designed for this project exclusively. While there are a great number of design approaches to designing the user interface, the following guidelines shall be adhered to:

- 1) The use of custom system programming from prior projects and/or 'modules' provided by a given manufacturer or programmer may or may not meet the functional intent of the systems and work described herein. It is the responsibility of the AV Contractor to meet the functional intent of the systems in this specification, including any and all necessary modification of program code or creation of custom modules as required.
 - 2) The operation(s) of all system(s) are to match the functional intent already implemented at the owner's facilities as applicable.
 - 3) All panels are to have the time and date as icons, in the same position on every page.
 - 4) All panels are to have a title, indicating the piece of equipment and/or functionality being controlled.
 - 5) Final programming shall include capability to remotely control all functions of the audiovisual system. Only functions required for normal use shall appear on top level pages while underlying "Tech Pages" shall provide access to full manufacturer's remote control functionality.
 - 6) Devices similar in nature shall be programmed to operate with a common format.
 - 7) No individual component shall be programmed to function atypically.
 - 8) Whenever the same button appears on more than one page, it will be in the same position on each page.
 - 9) Where feasible, multi-level access to controls should be implemented. See paragraph "e", above.
 - b. During performance testing, all equipment shall be operated under standard conditions as recommended by the manufacturer.
 - c. Please see Detailed Specifications for further information on specific control system programming requirements.
- B. Performance Test Signal Paths
1. The signal paths for the above Performance Standards shall be as follows:
 - a. Audio:
 - 1) From all source inputs (for microphones, audio tape units, video tape units, etc.) through all mixers, switchers, etc., to all signal destinations.
 - b. Video:
 - 1) From all sources of the above signal paths. This shall not exempt the AV Contractor from the responsibility of checking all paths and outlets for appropriate compliance with the Performance Standards, see section below for detailed requirements.
- C. Optical
1. All optical projection systems shall meet the following performance standards:
 - a. The total averaged light output from a projector, in lumens, shall be within plus-or-minus 15% of that specified by the projector manufacturer.
 - b. The "corner" location shall be defined as the four points determined by intersecting lines drawn 5% of the distance in from the focused edges of the image.
 - c. The light meter used for the above measurements shall be a properly calibrated foot-candle (or lux) meter and shall be cosine-corrected.
 2. Projectors, lenses, and mirrors shall be solidly mounted and braced, so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.

3.4 CONTRACTOR SYSTEM CHECKOUT

- A. Before Commissioning Tests are scheduled, the Contractor shall perform his own system checkout based upon an approved testing procedure for the systems. The Contractor shall

furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification. The Contractor shall submit a testing plan which shall be in accordance with ANSI-INFOCOMM standard 10-2013-Audiovisual Systems Performance verification for approval by the individual or firm representing the Owner during the Audiovisual Installation. At a minimum, the following sub-components of the Audiovisual System shall be tested and verified:

1. Cable and Connectors
 - a. All cables and connectors shall be tested and verified to comply with the manufacturer's specifications and design intent
 - b. Cable test results shall be submitted in advance of the Commissioning for review by the Owner's Representative
2. Devices
 - a. All devices shall meet the functionality as specified by manufacturer.
 - b. If any device is found to deviate from the manufacturer's functionality it shall be replaced by the Audiovisual Systems Contractor at no cost to the Owner.
3. Signal Types
 - a. The Audiovisual System shall be tested to comply with all video and audio standards as specified in the Performance Standards section and described by the design intent.
4. System Function
 - a. The cables and connectors, devices, and signal types shall meet the functional requirements as specified by the design intent.
 - b. Acceptable testing procedures may include but is not limited to that which is described in the detailed specifications such as (streaming, push-to-talk, annotation, etc.)
5. Document that all matrix switching crosspoints have been tested and verified.
6. Provide documentation that all Cobranet / Dante / AVB bundles and audio signal lines have been tested and verified.
7. Test all audio and video systems for compliance with the Performance Standards, using the example procedure outlined in appendix A:
 - a. Test Equipment: The following test equipment (or submit equivalent for approval) shall be used to test the systems on site.
 - 1) Audio check:
 - a) Time based measurement system, Goldline TEF20 or SIA Smaart live with laptop PC, calibrated omnidirectional mic, and appropriate interface
 - b) Audio test set, Audio Precision ATS-1DD
 - c) Media representative of all types found in the subject system
 - d) Audio cables as required to connect test equipment to the system
 - e) Set of terminations, adapters etc.
 - 2) Video checks:
 - a) Video, Component, RGBS, RGBHV and Digital video signal generator, Extron VTG 400 DVI
 - b) Digital Video test generator with EDID and HDCP components, PureLink HDG-8000 PRO
 - c) Media and portable hardware (i.e laptop) representative of all types found in the subject system including but not limited to Blu-ray™ players and discs (provide discs with and without HDCP encrypted content), mobile PC/Tablets.
 - d) RGB cable, Extron BNC-5-6'HR
 - e) Video cable
 - f) Set of terminations, 'T' pieces etc.
 - 3) Gain Setting
 - a) Adjust all systems (end to end within a system) for maximum signal-to-noise ratio. No hiss should be audible through any loudspeaker at the completion of gain structure setting, and all audio gain stages should clip simultaneously.
8. Signal Paths
 - a. Video/Audio

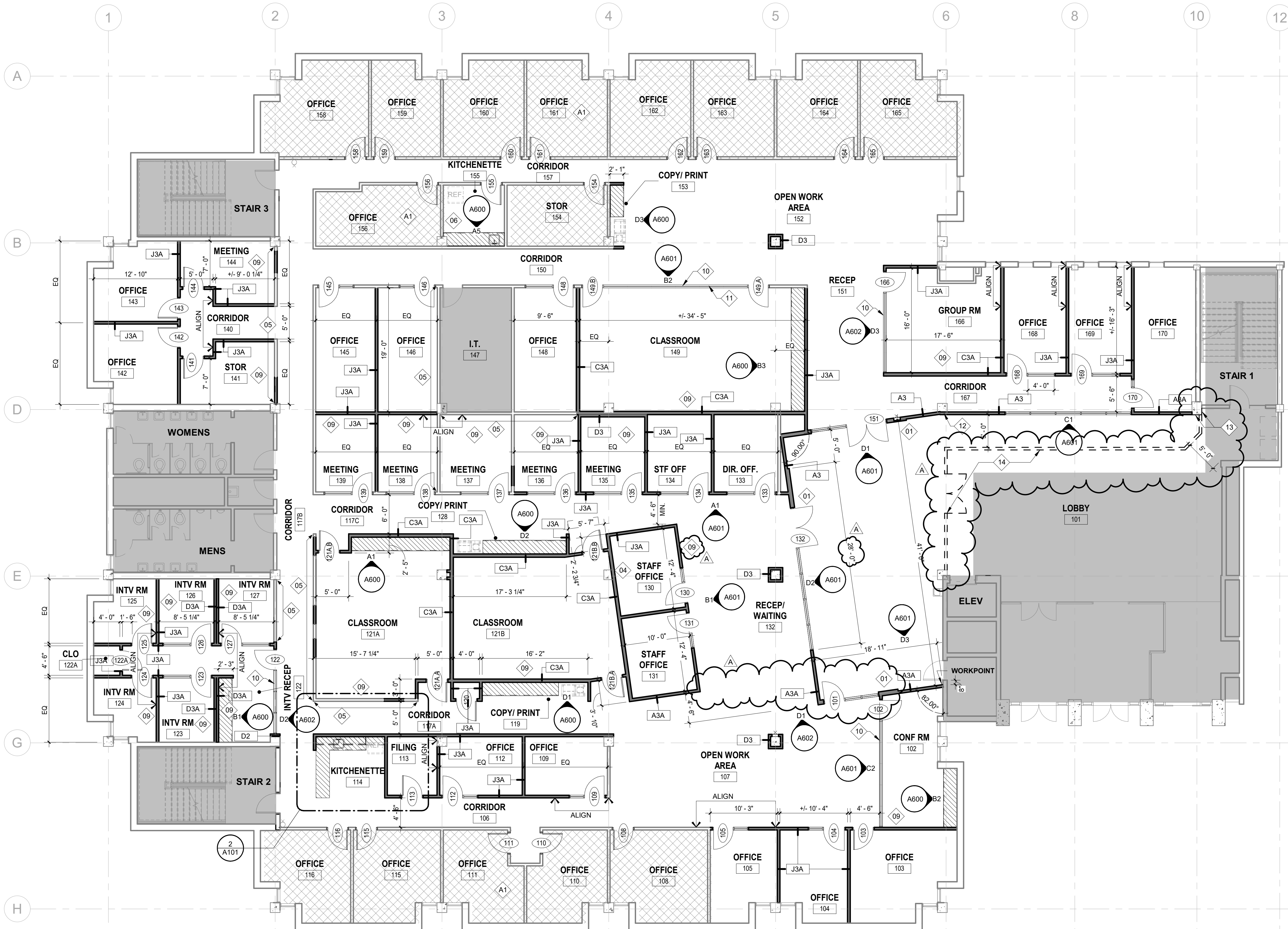
- 1) Connect the output of the video signal generator to a floor box/table/rack connector and select the "Full Field Color Bar" signal. Connect the combined waveform monitor/vectorscope to a final output point, e.g. an input to a picture monitor or video projector. Ensure that the test signal is routed to the selected output.
- 2) Measure and record the signal amplitudes.
- 3) Repeat item '1' after selecting the "Multiburst, 50 IRE" test signal.
- 4) Measure and record the signal amplitudes.
- 5) Repeat item '1' after selecting the "Modulated 5-step" test signal.
- 6) Measure and record the signal differential phase and gain.
- 7) Repeat item #'s '1' through '6' for other video signal paths.
- 8) Repeat item '1' after selecting the Window test signal.
- 9) Measure and record the signal line and field tilt.
- 10) Repeat item '1' after connecting the Black Burst signal from a rear mounted connector.
- 11) Measure and record the signal/noise ratio.
- 12) Connect the output of the audio test set to a floor box/table/rack program audio connector and connect the input of the audio test set to a final output point, e.g. an input to a program speaker power amplifier. Ensure that the test signal is routed to the selected output, that the volume control is set to 100% and that the equalizers are bypassed.
- 13) Measure and record the signal/noise ratio, total harmonic distortion and frequency response.
- 14) Repeat items '12' and '13' for other audio signal paths.
- 15) Connect the output of the audio test set to a floor box/table/rack speech audio connector and connect the input of the audio test set to a final output point, e.g. an input to a speech speaker power amplifier. Ensure that the test signal is routed to the selected output, that the volume control is set to 100% and that the equalizer is bypassed.
- 16) Measure and record the signal/noise ratio, total harmonic distortion and frequency response.
- 17) Repeat items '15' and '16' for other audio signal paths.
- 18) DVI: Connect the DVI output of the signal generator to a floorbox/table/rack connector and select the SMPTE & PLUGE signal at the various computer scan rates as follows:
 - a) 640 x 480 31.5 kHz H, 60 Hz V
 - b) 640 x 480 37.5 kHz H, 75 Hz V
 - c) 800 x 600 38 kHz H, 60 Hz V
 - d) 832 x 624 49.7 kHz H, 75 Hz V
 - e) 1024 x 768 48 kHz H, 60 Hz V
 - f) 1280 x 768 48 kHz H, 60 Hz V
 - g) 1366 x 768 47.8 kHz H, 60 Hz V
 - h) 1280 x 1024 64 kHz H, 60 Hz V
 - i) 1400 x 1050 63.9 kHz H, 60 Hz V
 - j) HD 720p 45 kHz H, 60 Hz V
 - k) HD 1080i 33.75 kHz H, 30/60 Hz V
 - l) HD 1080p 33.75 kHz H, 30/60 Hz V
- 19) Check that the image is correctly displayed on the picture monitor(s) and/or by the video projector.
- 20) Repeat item '2' using Crosshatch signal, checkerboard signal and H Pattern signal.
- 21) Repeat item '2' for other DVI connection locations.
- 22) Connect the output of the audio signal generator to a floorbox/table/rack 'Left' and 'Right' connectors and select the 1 kHz tone. Check that the signal is emitted from the left and right program speakers.
- 23) Repeat item 'v' for other audio connection location.

- 24) Note: Whenever possible, include computer sources provided by the Owner, at the desired resolution, in your testing.
- 25) Note: The term "RGB" is used generically. The system will be tested with the sync format dictated by functional requirements, including, but not limited to, sync-on-green, composite sync and separate horizontal and vertical sync. Whenever possible, include computer sources provided by the Owner, at the desired resolution, in your testing.
- b. At the conclusion of the tests, return all equipment settings to previously calibrated positions.
- c. Provide written records of all test results in spreadsheet form.
- d. Check all control functions, from all controlling devices to all controlled devices, for proper operations.
- e. Adjust, balance, and align all equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for all level controls, and record these settings in the "System Operation and Maintenance Manual".
- f. Check all optical projection images for average light level, light fall-off, and image alignment and size to comply with the Performance Standards and specifications drawings. Check to determine that all projectors, projector bases, carts, tables, and mirrors are rigid and vibration-less in operation.
- g. Maintain documentation of all performance tests for reference by the Consultant during the System Acceptance Tests.

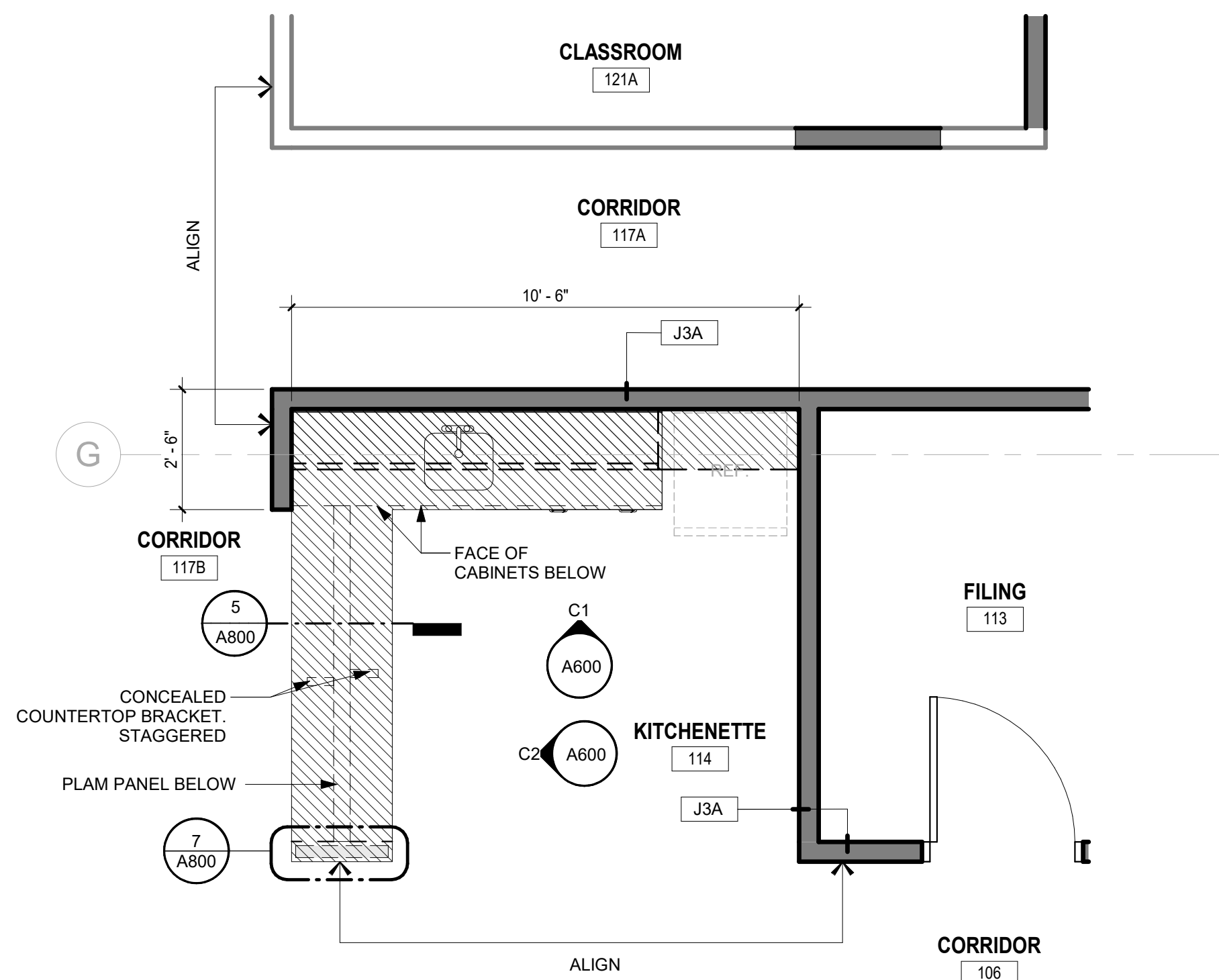
3.5 COMMISSIONING TESTS

- A. Commissioning Tests will not be performed until the Contractor's System Checkout has been completed and the test results have been reviewed. The Commissioning Tests will be supervised by the Owner's Representative and shall consist of the following at a minimum:
 - 1. A physical inventory of all equipment on site and will be compared to equipment lists in the contract documents.
 - 2. The operation of all system equipment shall be demonstrated by the Contractor.
 - 3. Review of final As-Build documentation as described in the "Contractors Documentation" section of this specification.
 - 4. Both subjective and objective tests will be required by the Owner's Representative to determine compliance with the specifications. The Contractor shall be responsible for providing test equipment for these tests.
 - 5. All final, "as-built" drawings, run sheets, manuals, and other required documents, as detailed in Part I, shall be on hand. Two complete sets of these documents shall be delivered to the Owner at this time. (One complete set shall have been delivered to the Consultant prior to the scheduling of Acceptance Tests).
- B. In the event further adjustment is required, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the Owner's Representative.
- C. Any charge for additional time incurred by the Owner's Representative required to over-see the system tests, due to improper system installation or previous failed systems, shall be the responsibility of, and charged directly to the contractor

END OF SECTION



1 OVERALL FIRST FLOOR PLAN (PHASE 2)
1/8" = 1'-0"



2 ENLARGED KITCHENETTE 114 PLAN
3/8" = 1'-0"

FLOOR PLAN GENERAL NOTES

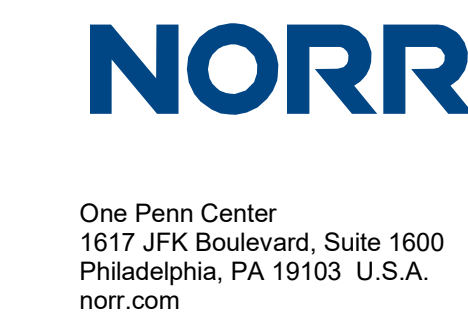
- DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS GOVERN. ALL PARTITION LOCATIONS SHALL BE AS SHOWN ON PARTITION PLAN. IN CASE OF CONFLICT NOTIFY ARCHITECT IMMEDIATELY. PARTITION PLAN BY ARCHITECT TAKES PRECEDENCE OVER ALL OTHER PLANS.
- DIMENSIONS NOTED "CLEAR" OR "CLR" OR "HOLD" MUST BE ACCURATELY MAINTAINED. SHALL ALLOW FOR THICKNESS OF ALL WALL FINISHES U.O.N. AND SHALL NOT VARY MORE THAN + 1/8" WITHOUT WRITTEN INSTRUCTION FROM ARCHITECT.
- ALL PARTITIONS ARE DIMENSIONED FROM FINISH FACE OF GYPSUM BOARD TO FINISH FACE OF GYPSUM BOARD U.O.N.
- ALL PARTITIONS ARE TYPE A3A U.O.N.
- ALL FLOOR SLAB PENETRATIONS FOR PIPING SHALL BE FULLY PACKED AND SEALED IN ACCORDANCE WITH THE APPLICABLE BUILDING AND FIRE CODES. ANY PENETRATIONS AT RATED PARTITIONS TO BE PER APPLICABLE UL ASSEMBLY.
- U.O.N. DOORS ARE CENTERED OR HINGE SIDE IS TO BE LOCATED 6" FROM CORNER AS INDICATED. DOORS MUST HAVE 1'-0" CLEAR ON STRIKE/PULL SIDE AND 12" CLEAR ON STRIKE/PUSH SIDE OF DOOR. VERIFY AND ADVISE ARCHITECTS OF EXCEPTIONS PRIOR TO CLOSING OUT PARTITIONS.
- ALL GYPSUM BOARD PARTITIONS SHALL BE TAPED AND SANDED SMOOTH WITH NO VISIBLE JOINTS. PATCH AND REPAIR SURFACES TO MATCH ADJACENT OR ADJOINING SURFACES WHERE REQUIRED.
- REFER TO 3000-SERIES SHEETS FOR ADDITIONAL NOTES, LEGENDS, SYMBOLS, ABBREVIATIONS, AND SCHEDULES.
- ALL MILLWORK & WALL-HUNG FURNITURE TO BE FASTENED TO THE PARTITION. PROVIDE BLOCKING FOR ALL MILLWORK & WALL-HUNG FURNITURE NOT SUPPORTED BY THE SLAB OR ABOVE 4'-0" HEIGHT. ALL CONCEALED WOOD BLOCKING TO BE FIRE TREATED, AS REQUIRED BY APPLICABLE CODES.
- PREPARE SURFACES TO RECEIVE NEW FINISHES, AS REQUIRED. FINISHES TO BE INSTALLED PER MANUFACTURERS SPECIFICATIONS.
- ALL APPLIANCES AND EQUIPMENT TO BE PROVIDED BY OWNER. U.O.N.
- CABLING EXISTING TO REMAIN THAT IS TO BE INCORPORATED INTO NEW WALL PARTITIONS INSTALLED TO DECK SHALL BE INSTALLED INTO NEW RETROFIT SLEEVING ASSEMBLIES. CABLING SHALL NOT BE EMBEDDED INTO DRYWALL. RETRO SLEEVING KIT IS 4" STI SPEC SEAL READY SPLIT SLEEVE.

FLOOR PLAN LEGEND

- EXISTING PARTITION TO REMAIN
- EXISTING DOOR TO REMAIN
- NEW PARTITION, SEE PARTITION TAGS AND TYPES
- NEW PARTITION TAG, SEE PARTITION TYPES
- NEW DOOR & DOOR TAG WITH DOOR NUMBER
- FIRE EXTINGUISHER CABINET (SEMI-RECESSED). BOD: JL ACTIVAR COSMIC MULTIPURPOSE DRY G115 FIRE EXTINGUISHER IN AL ACTIVAR CLEAR VU (MODEL #1516) ACRYLIC BUBBLE FRONT SEMI-RECESSED FIRE EXTINGUISHER CABINET (STAINLESS STEEL FINISH)
- NEW MILLWORK
- ALT #1 AREA OF WORK
- NOT IN SCOPE

KEYED NOTES - FLOOR PLANS

TAG	DESCRIPTION
01	PROVIDE BLOCKING IN WALL AS REQ'D FOR PIN MTD WALL SIGNAGE.
02	NEW RETURN SHAFT LOCATION. PROVIDE 12X12" ACCESS DOOR. COORDINATE FINAL LOCATION IN FIELD. REFER TO MECH DRAWINGS FOR MORE INFORMATION.
03	ADD LAYER OF 5/8" GWB TO EXISTING STUD. GWB TO GO FROM FLOOR SCRIBED TO BOTTOM OF DECK.
04	PARTITION TO BE TIGHT TO EXIST. COLUMN.
05	EXTEND EXISTING PARTITION 6" BEYOND CEILING. CONSTRUCTION TO MATCH EXISTING. REFER TO RCP FOR CEILING HEIGHT.
06	PROVIDE NEW COUNTERTOP W/ 4" BACKSPLASH ON EXISTING BASE CABINETS. NEW SINK IN APPROXIMATE LOCATION SHOWN ON PLAN. COORDINATE SPEC W/ PLUMBING DRAWINGS. INCLUDE PRICING INTO BASE BID.
07	PARTITION AS NOTED. PROVIDE 1" AIR GAP BETWEEN EXISTING NEW PARTITION.
08	NEW FLOOR CORE. REFER TO ELECTRICAL DRAWINGS.
09	PROVIDE BLOCKING IN WALL AS REQ'D FOR WALL MTD. TV. COORDINATE W/ EXTENTS OF BLOCKING W/ AV DRAWINGS.
10	PROVIDE COLD-FORMED METAL BRACING UP TO STRUCTURE ABOVE AT ALL LOCATIONS WHERE DRYWALL PARTITION ABOVE ALUMINUM / GLASS ASSEMBLY DOES NOT EXTEND TO UNDERSIDE OF STRUCTURE.
11	GLAZING AT THIS ALUMINUM FRAMED OPENING TO BE GL-2. SEE ELEVATION B2/A601.
12	PARTITION TO BE TIGHT TO EXIST. COLUMN.
13	5/8" THK LAYER OF GWB TO BE ADHERED DIRECTLY TO COLUMN SURFACE. PROVIDE CORNER BEAD. AFTER REMOVAL OF TEMPORARY WALL, FINISH TO MATCH ADJACENT PARTITION.
14	NEW TEMPORARY GWB PARTITION UP TO UNDERSIDE OF EXISTING CEILING (NO MECHANICAL CONNECTIONS TO EXISTING CEILING). CAVITY TO BE FILLED WITH FULL BATT INSULATION (FOR NOISE CONTROL). PROVIDE 6'-0" W/ 7'-0" TEMPORARY DOUBLE DOORS FOR CONTRACTOR ACCESS / MATERIAL LOADING / WASTE REMOVAL. PROVIDE PADLOCK OR CABLE LOCK HARDWARE. REFER TO GDMO POINT RCP FOR PLATE DOOR SCHEDULE FOR ALT #1 SCOPE OF WORK AND PROVIDE SEPARATE LINE ITEM PRICING.
A1	



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DESCRIPTION	DATE	BY	CHK
PHASE 2 - ADDENDUM #1	2023.12.01	GO	SK

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PROJECT NUMBER: 22031600
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SHEET TITLE
FIRST FLOOR PLAN

SHEET NUMBER

A101



1 FIRST FLR REFLECTED CEILING PLAN (PHASE 2)
1/8" = 1'-0"

REFLECTED CEILING PLAN GENERAL NOTES

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL CEILING SYSTEMS AND CONSTRUCTION AS DESIGNATED ON THE REFLECTED CEILING PLANS OF THESE DRAWINGS AND NOTES.
2. COORDINATE THE WORK OF ALL TRADES INVOLVED IN THE CEILING WORK TO ENSURE CLEARANCES FOR FIXTURES, DUCTS, PIPING, CEILING SUSPENSION SYSTEMS, ETC. NECESSARY TO MAINTAIN THE FINISHED CEILING HEIGHTS INDICATED ON ARCHITECT'S DRAWINGS.
3. FASCIAS OR ANY BREAK IN THE CEILING HEIGHTS CREATED BY THE INSTALLATION AND/OR ALTERATION OF HEATING, VENTING, AIR CONDITIONING, MECHANICAL DUCTS, PIPING, OR OTHER EQUIPMENT SHALL BE FORMED OF GYPSUM WALLBOARD ON FURRING CHANNELS.
4. PERIMETER CEILING ANGLES, WHERE OCCURRING, SHALL BE INSTALLED TIGHT TO VERTICAL SURFACES, FREE FROM CURVES. BREAKS OR OTHER IRREGULARITIES SHALL BE PAINTED TO MATCH CEILING FINISH.
5. FURNISH AND INSTALL ALL FIXTURES, ASSOCIATED TRIM, FIXTURE LAMPS, AND SEISMIC BRACING AS REQUIRED BY CODE.
6. ALL JOINTS IN THE TILE FIELD SHALL BE SQUARE, LEVEL, AND PERFECTLY ALIGNED WITH EACH OTHER AND THE RECESSED LIGHTING FIXTURES.
7. LIGHT FIXTURES, EXIT SIGNS, SPRINKLERS, AND OTHER CEILING ELEMENTS SHALL BE LOCATED IN THE CENTER OF INDIVIDUAL CEILING TILES, U.O.N.
8. ALL SOFFITS AND CEILING HEIGHTS ARE DIMENSIONED FROM TOP OF FINISHED FLOOR TO BOTTOM OF FINISHED GYP. BOARD OR CEILING TILE, AND SHALL ALLOW FOR THICKNESS OF ALL FLOOR FINISHES.
9. HUNG CEILING HEIGHTS SHALL BE AS SHOWN ON THE REFLECTED CEILING PLANS AND DETAILS. ANY DEVIATION FROM HEIGHTS OR CONDITIONS WILL BE SUBMITTED TO THE ARCHITECT FOR REVIEW.
10. CEILING IN CLOSETS AND STORAGE AREAS SHALL BE OF THE SAME HEIGHTS AND CONSTRUCTION AS THAT OF ADJOINING SPACES, U.O.N.
11. NOTIFY ARCHITECT OF ANY CONFLICTS OF LIGHT FIXTURE LOCATIONS WITH MAIN RUNNERS, DUCTS, STRUCTURES, HVAC, AND/OR EXISTING CONDUIT, PRIOR TO FRAMING FOR LIGHTS. ANY DISCREPANCIES BETWEEN ARCHITECT'S CEILING GRID AND ACTUAL FIELD CONDITION ARE TO BE CLARIFIED WITH ARCHITECT PRIOR TO FRAMING.
12. INSTALL LIGHT FIXTURES WITH PROTECTIVE FILM OR SIM. COVER OVER LOUVER, LENS, BAFFLE, ETC., TO AVOID FIXTURE SOILING OR DAMAGE. FIXTURES SHALL BE MAINTAINED CLEAN AND AS NEW. LAMPS SHALL BE NEW AT PROJECT COMPLETION.
13. ARCHITECTURAL DRAWINGS DETERMINE LOCATION OF ALL FIXTURES AND TAKE PRECEDENCE OVER ALL OTHERS, U.O.N.
14. ALL CEILING TILES SHALL BE INSTALLED IN THE SAME DIRECTION.

REFLECTED CEILING PLAN LEGEND

- 2 x 4 LIGHT FIXTURE
- 2 x 2 LIGHT FIXTURE
- RECESSED DOWNLIGHT
- LINEAR LIGHT FIXTURE
- PENDANT LIGHT FIXTURE
- CEILING-MOUNTED ILLUMINATED EXIT SIGN
- CEILING-MOUNTED DIRECTIONAL ILLUMINATED EXIT SIGN
- WALL-MOUNTED ILLUMINATED EXIT SIGN
- WALL-MOUNTED DIRECTIONAL ILLUMINATED EXIT SIGN
- HVAC SUPPLY DIFFUSER
- HVAC RETURN GRILLE
- GWB CEILING
- PROVIDE ADD ALTERNATE PRICE FOR ANY SCOPE IN THIS AREA
- AREA NOT IN SCOPE OF WORK

KEYED NOTES - REFLECTED CEILING PLANS

TAG	DESCRIPTION
01	EXTEND EXISTING CEILING GRID INTO RECESS, CEILING & GRID TO MATCH EXISTING.
02	EXISTING WAFFLE SLAB DECK OVERHEAD EXPOSED, TO BE PAINTED ECP-1. ALL CABLING AND WIRES TO BE NEATLY BUNDLED AND TIED TO THE BOTTOM OF STRUCTURE W/ J-HOOKS. ALL NEW DUCTWORK TO HAVE INTERNAL INSULATION AND BE PAINTED SAME COLOR AS BOTTOM OF DECK. ALL PIPING TO BE PAINTED SAME COLOR AS BOTTOM OF DECK.
03	EXISTING GWB CEILING TO REMAIN. PATCH & REPAIR AS REQ'D
04	ARMSTRONG 4" AXIOM FELD FACE PLATE
05	PATCH EXISTING GWB CEILING AS REQ'D
06	AXIOM AX10STR TRIM AT ALL EDGES
07	BOTTOM OF 24" DIAMETER PENDANT TO BE 7'-6"
08	BOTTOM OF 36" DIAMETER PENDANT TO BE 8'-6"
09	EXISTING CEILING TILE AT CORRIDOR IS ACT 2 (SEE FINISH SCHEDULE). EXISTING CEILING TILE / GRID TO REMAIN. ANY DAMAGED TILE TO BE REPLACED WITH NEW AS NECESSARY.
10	EXISTING CEILING IN THIS AREA TO REMAIN. CONTRACTOR TO REINSTALL ANY EXISTING CEILING TILE / GRID IN THIS AREA DUE TO ANY ABOVE CEILING WORK (MECHANICAL, ELECTRICAL, OR PLUMBING) REQUIRED.
11	EXISTING DRYWALL SOFFIT TO REMAIN. AT AREA OF EXPOSED CEILING, PROVIDE FINISHED VERTICAL GWB UP TO UNDERSIDE OF STRUCTURE. CUT EXISTING LOBBY CEILING GRID / ACOUSTIC CEILING TILE AS REQ TO TERMINATE CLEANLY AT LINE OF NEW FASCIA. PENETRATIONS THROUGH FINISHED VERTICAL DRYWALL FACE TO BE CUT CLEANLY / TIGHTLY AROUND DUCTWORK, PIPING, CONDUIT, ETC. AND CAULKED.
A1	PROVIDE ADD ALTERNATE PRICING TO PROVIDE AND INSTALL NEW ACOUSTIC CEILING TILE ASSEMBLIES (IN LIEU OF EXISTING TO REMAIN) AS SCHEDULED IN AREAS INDICATED.

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PHASE 2 - ADDENDUM #1	2023.12.01	SK	SK

REV	DATE	DESCRIPTION
1	2023.12.01	

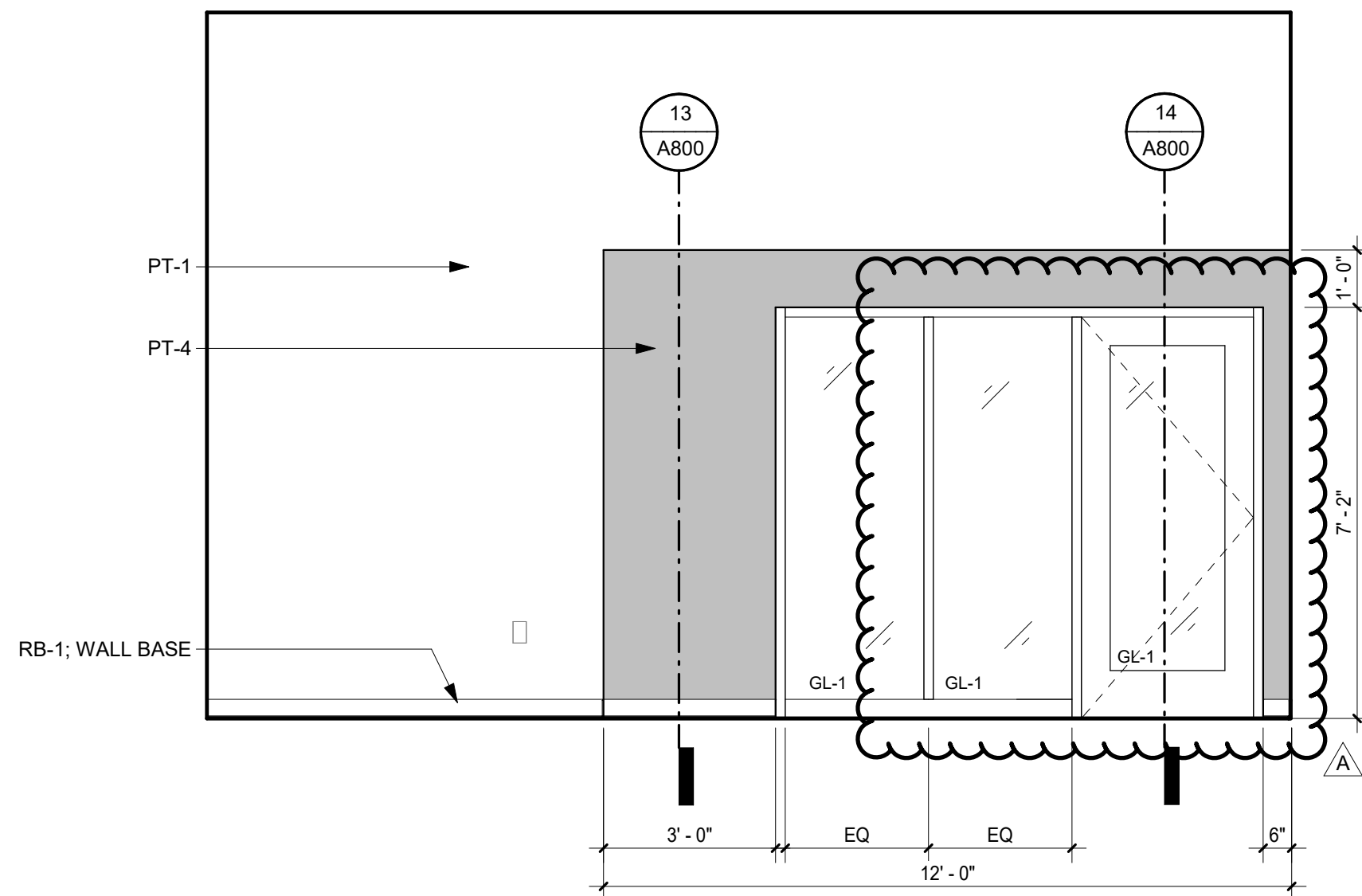
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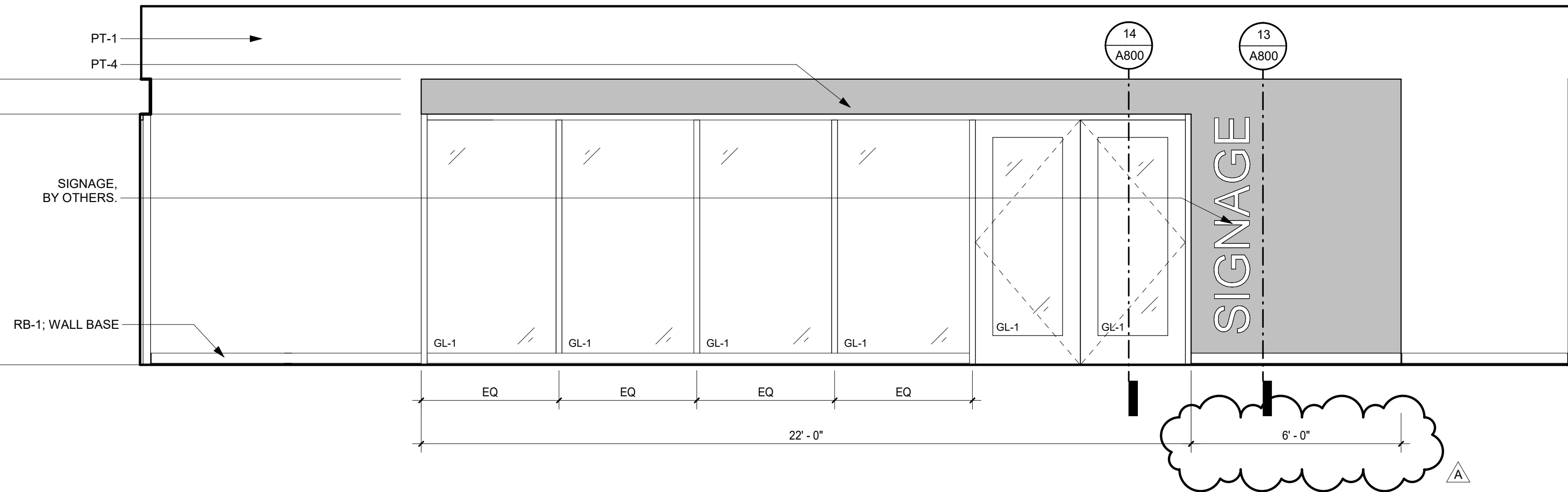
**FIRST FLOOR
REFLECTED CEILING
PLAN**

SHEET NUMBER

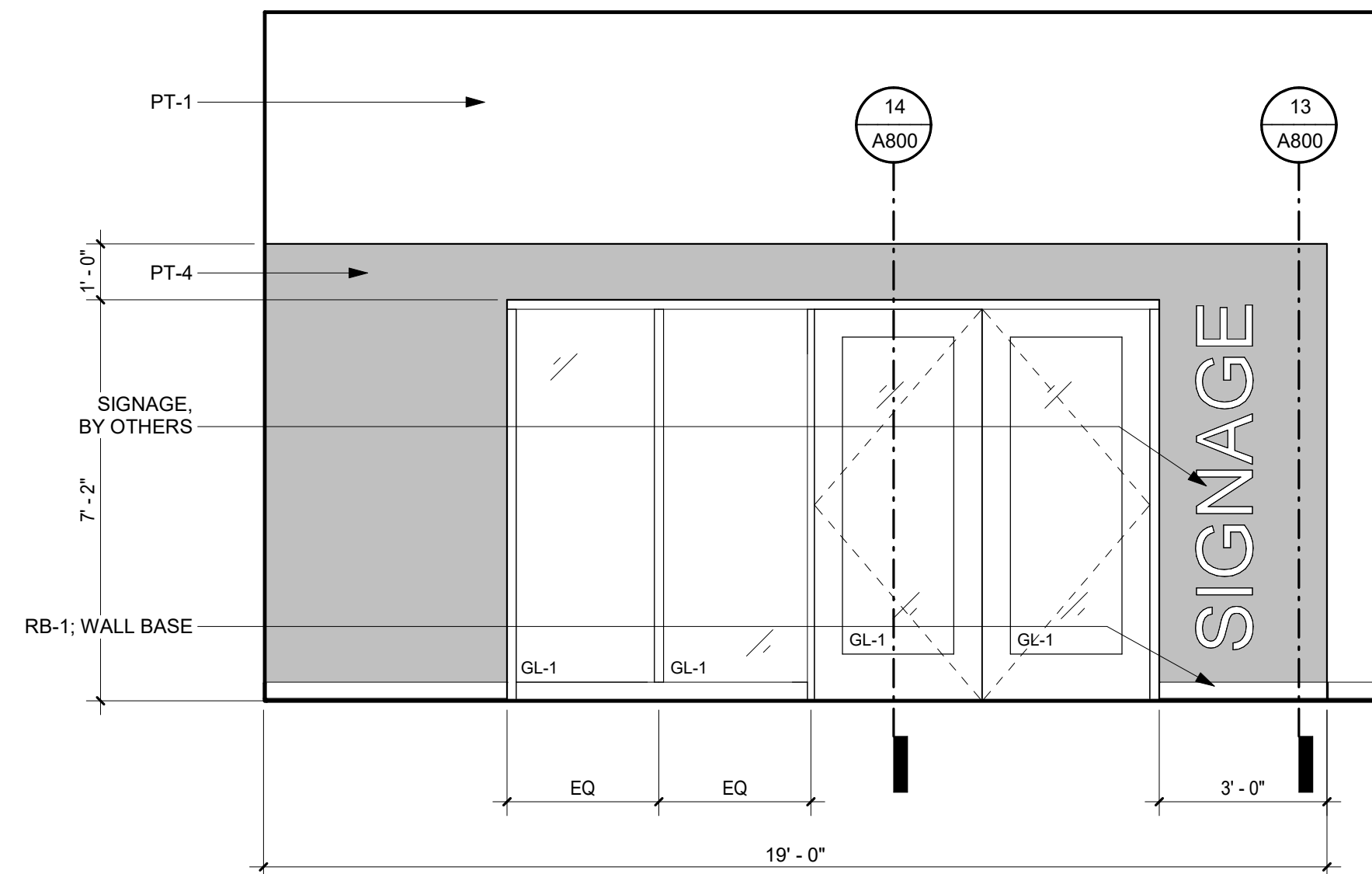
A401



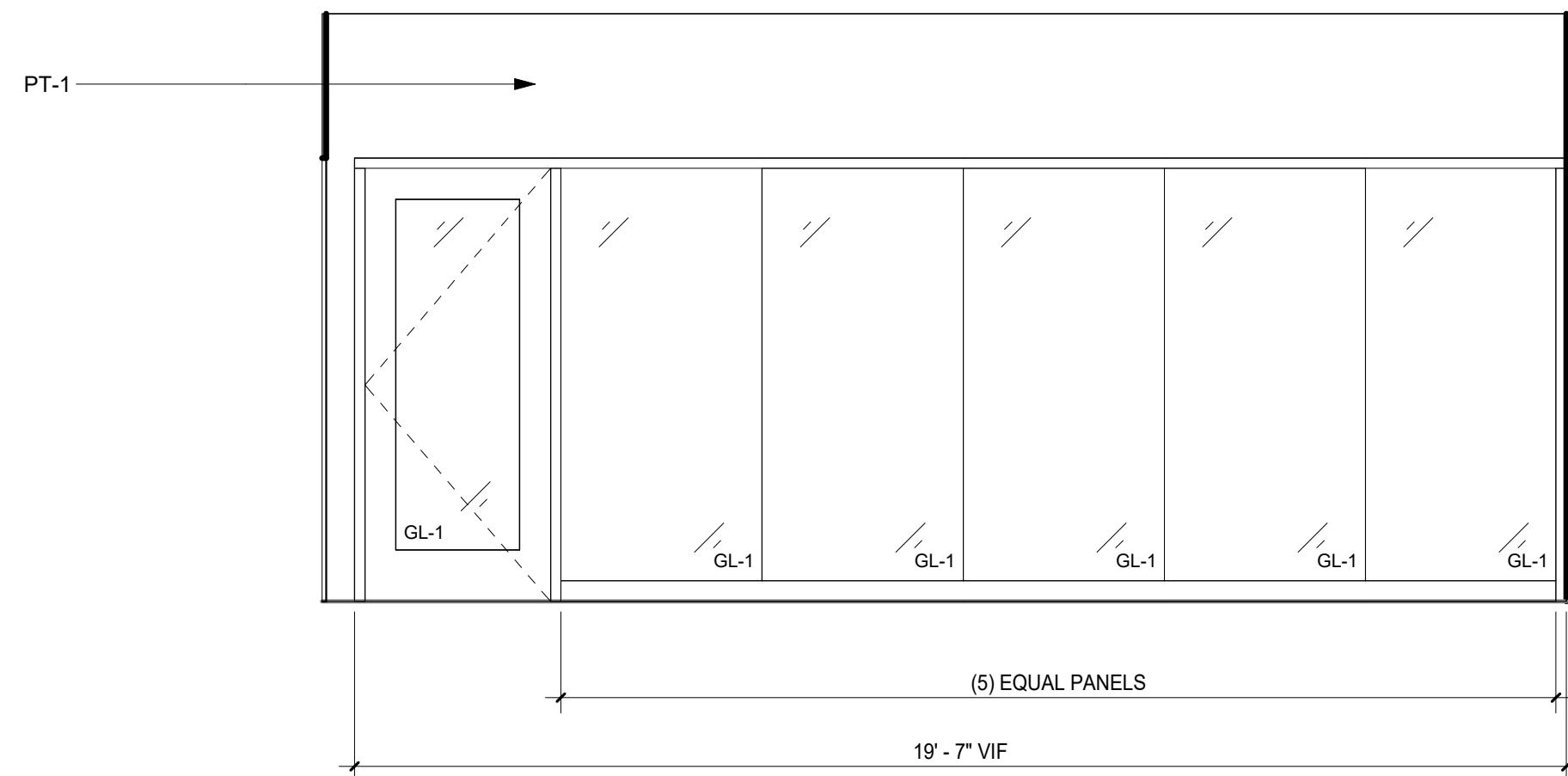
D3 ELEVATION @ LOBBY ENTRY TO CAREER CENTER
3/8" = 1'-0"



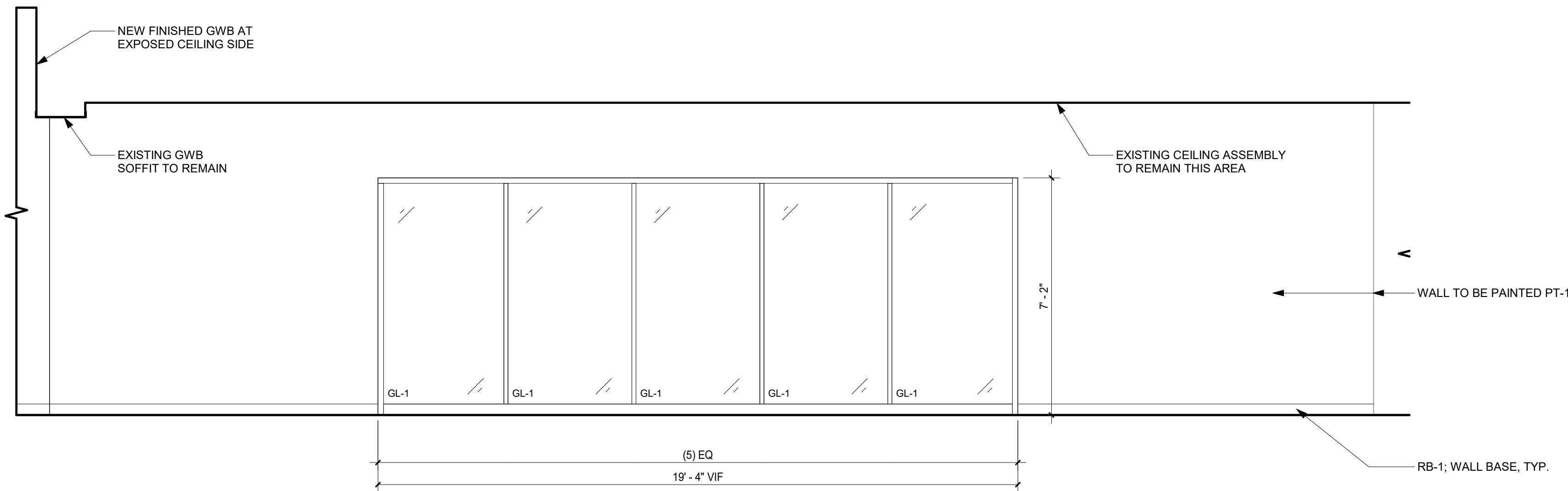
D2 ELEVATION @ LOBBY ENTRY TO ACADEMIC ADVISING
3/8" = 1'-0"



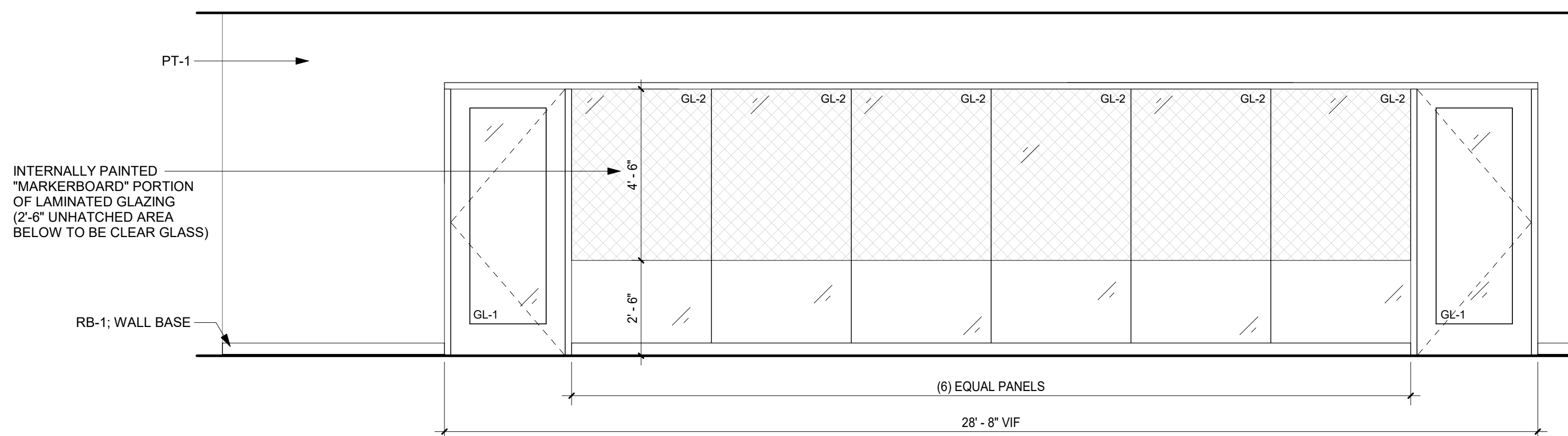
D1 ELEVATION @ LOBBY ENTRY TO STUDENT SUCCESS
3/8" = 1'-0"



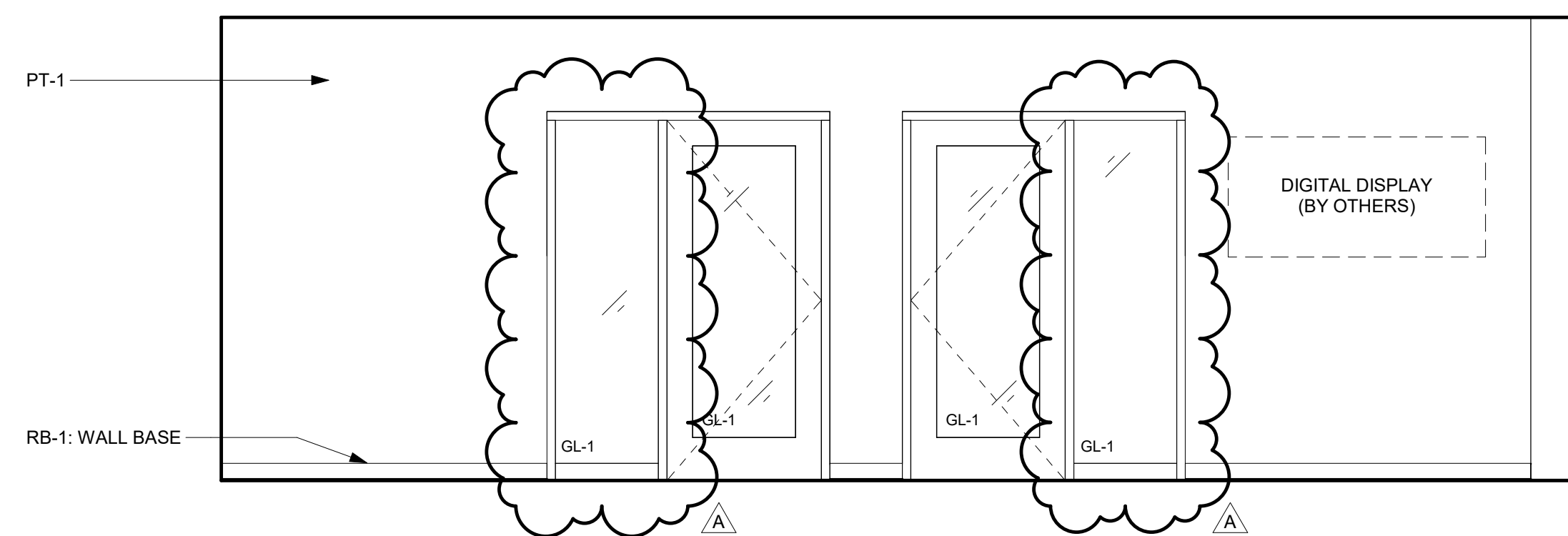
C2 ELEVATION @ CONFERENCE ROOM 102
3/8" = 1'-0"



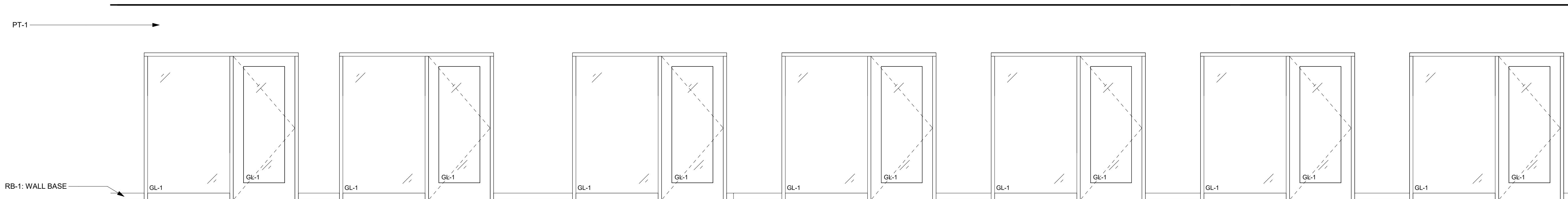
C1 ELEVATION @ LOBBY
3/8" = 1'-0"



B2 ELEVATION @ CLASSROOM 149
3/8" = 1'-0"



B1 ELEVATION @ OFFICE 130-131
3/8" = 1'-0"



A1 ELEVATION @ OFFICE 133-134, MEETING RM
135-139
3/8" = 1'-0"

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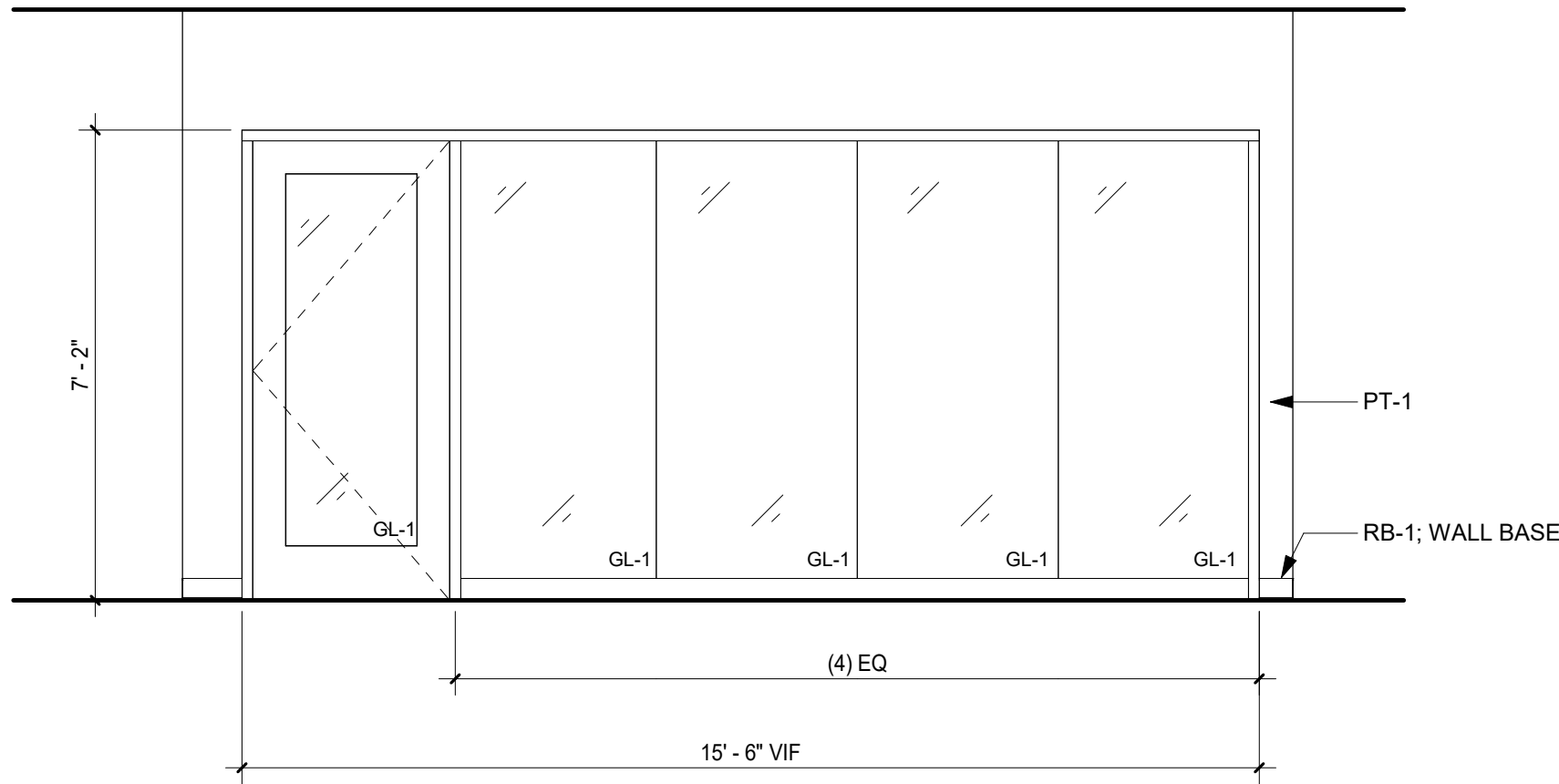
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3	2023.12.01	PHASE 2 - ADDENDUM #3 (GO)	SK	
4	2023.12.01	PHASE 2 - ADDENDUM #4 (GO)	SK	
5	2023.12.01	PHASE 2 - ADDENDUM #5 (GO)	SK	
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7	2023.12.01	PHASE 2 - ADDENDUM #7 (GO)	SK	
8	2023.12.01	PHASE 2 - ADDENDUM #8 (GO)	SK	
9	2023.12.01	PHASE 2 - ADDENDUM #9 (GO)	SK	
10	2023.12.01	PHASE 2 - ADDENDUM #10 (GO)	SK	
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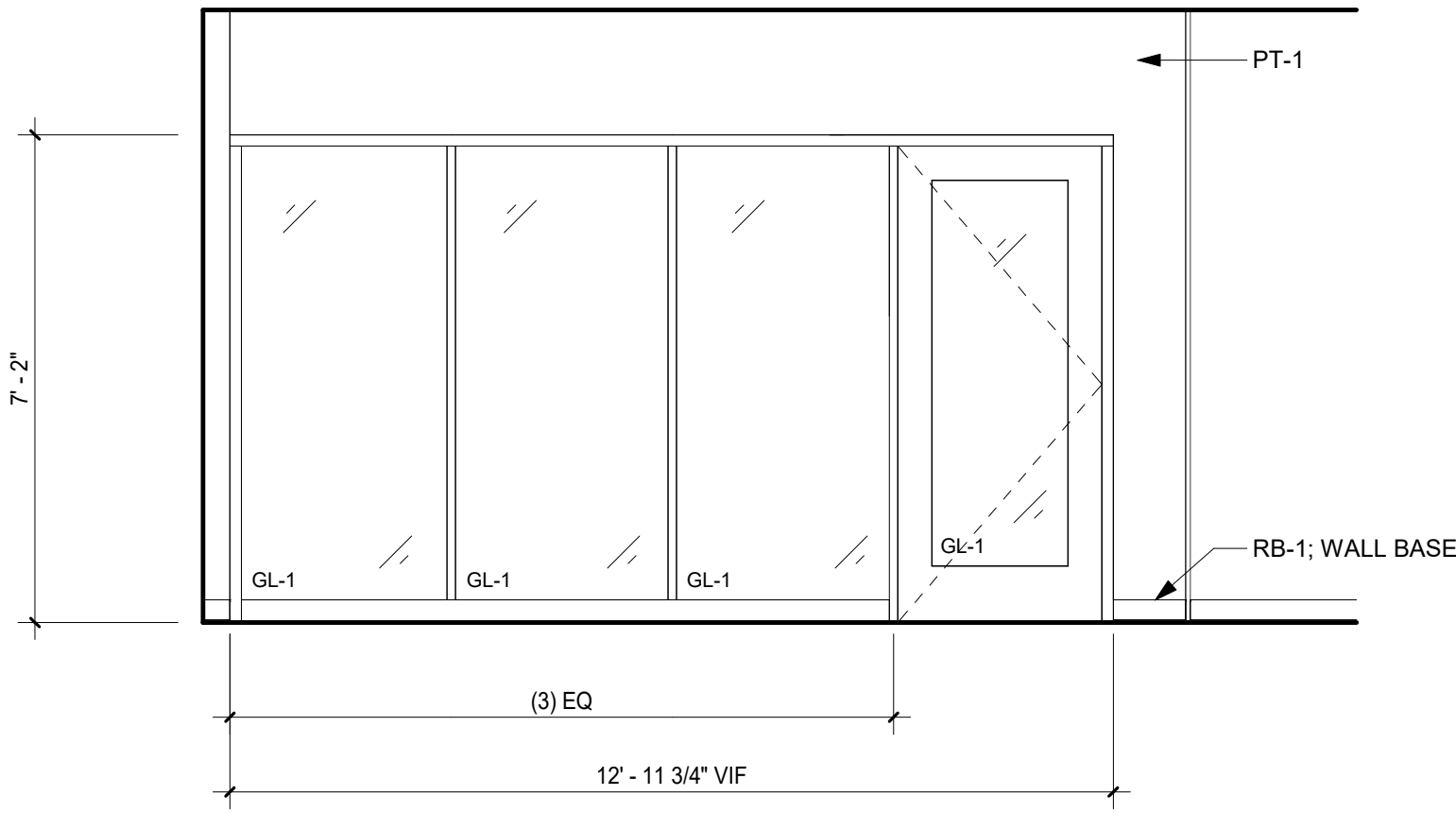
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PROJECT NUMBER: 22031600
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SHEET TITLE:
INTERIOR ELEVATIONS

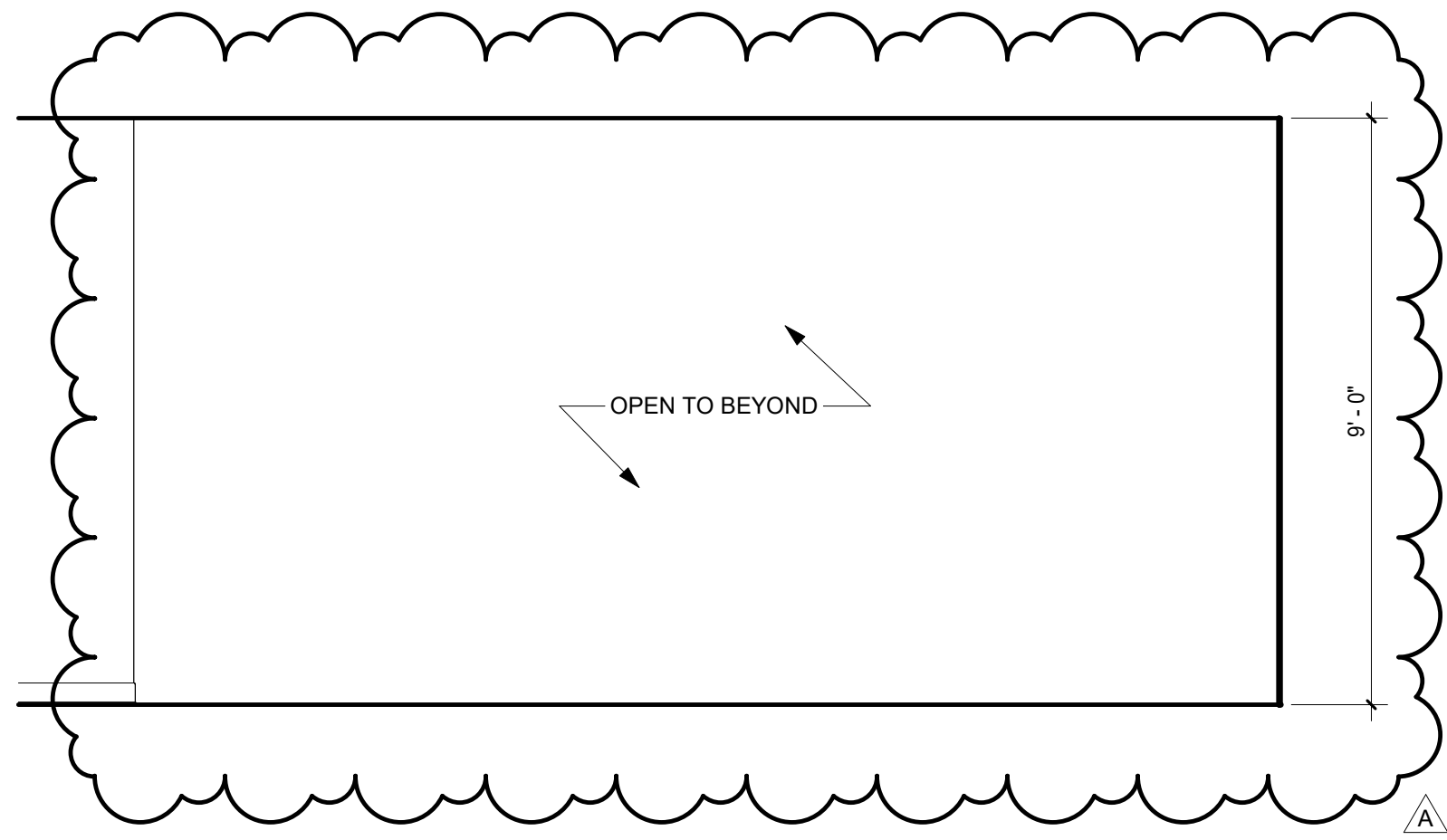
SHEET NUMBER:
A601



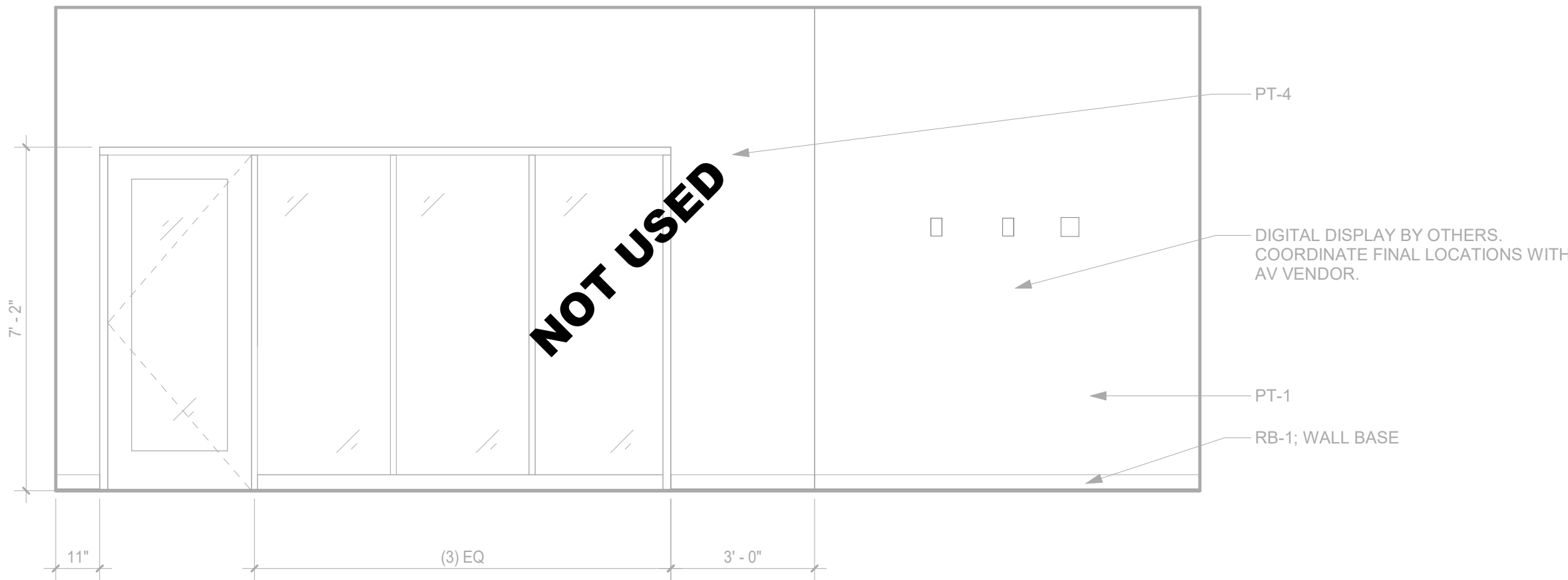
D3 GROUP ROOM 166
3/8" = 1'-0"



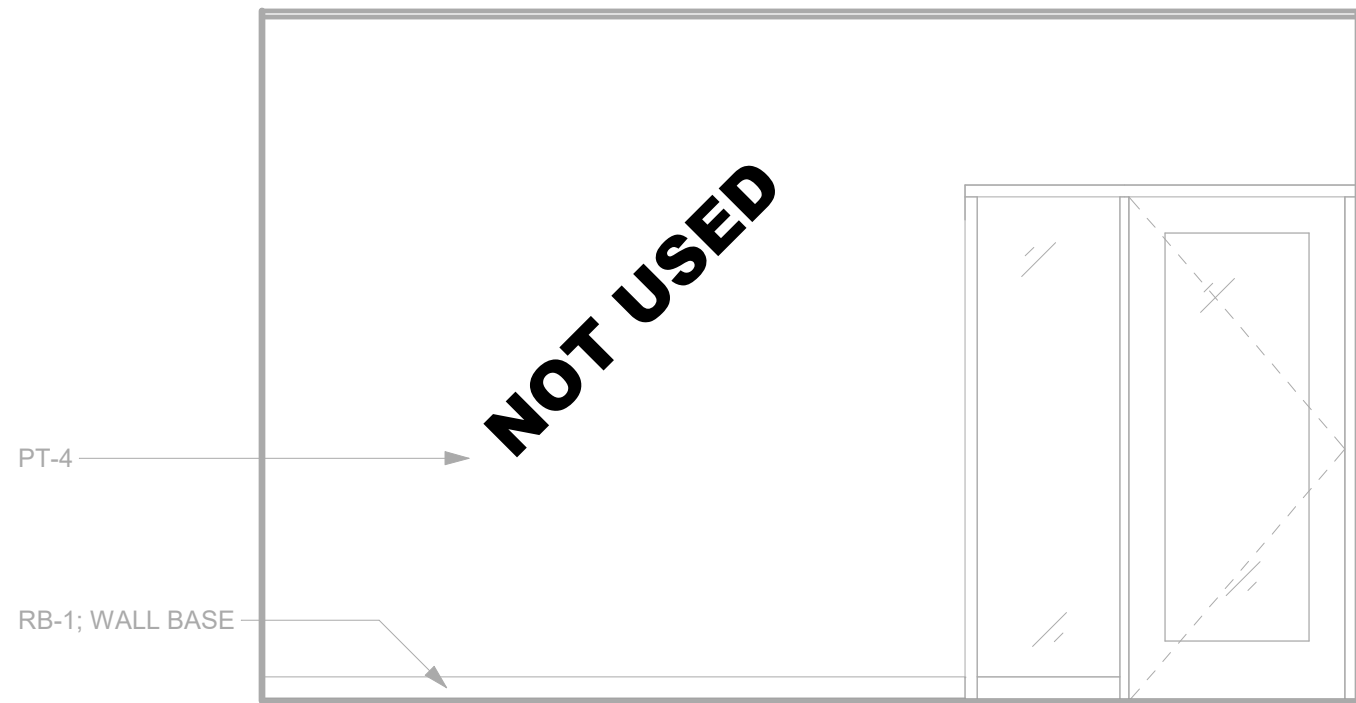
D2 INTERVIEW SUITE ENTRY 122
3/8" = 1'-0"



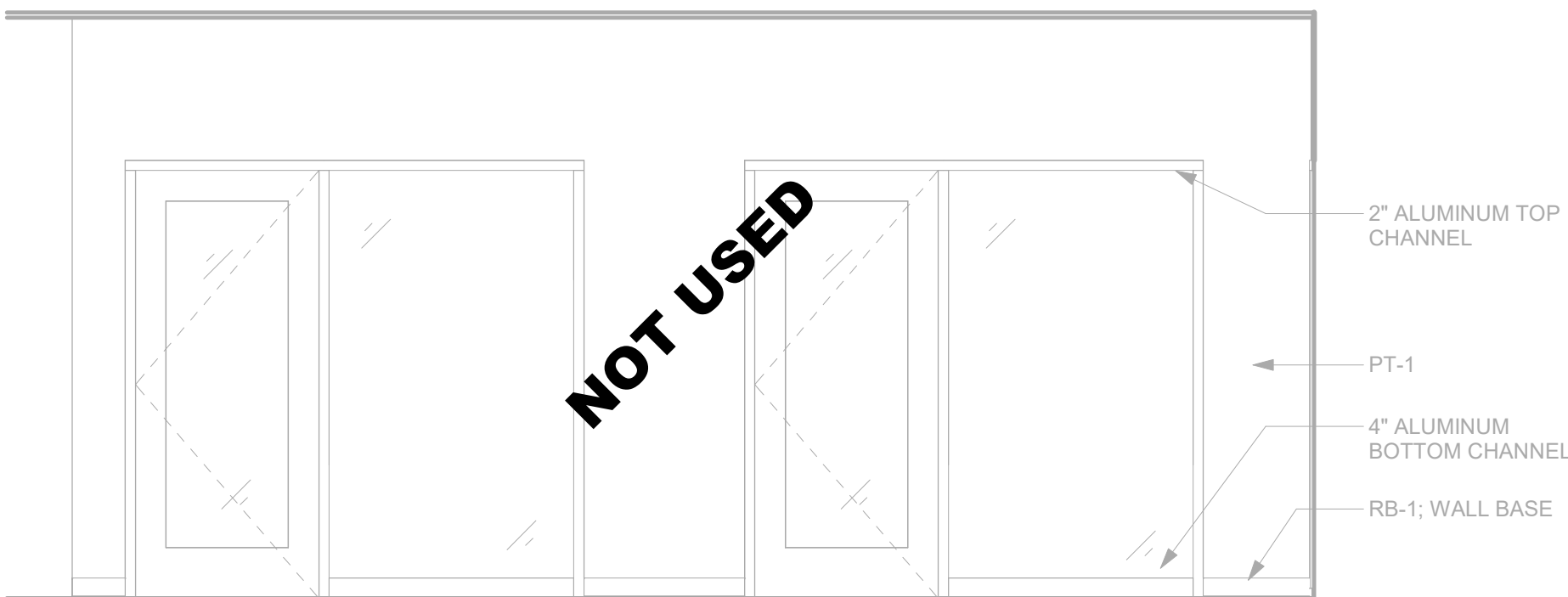
D1 STUDENT SUCCESS PARTITION 132
3/8" = 1'-0"



C2 TUTORING CENTER WEST ENTRY
3/8" = 1'-0"



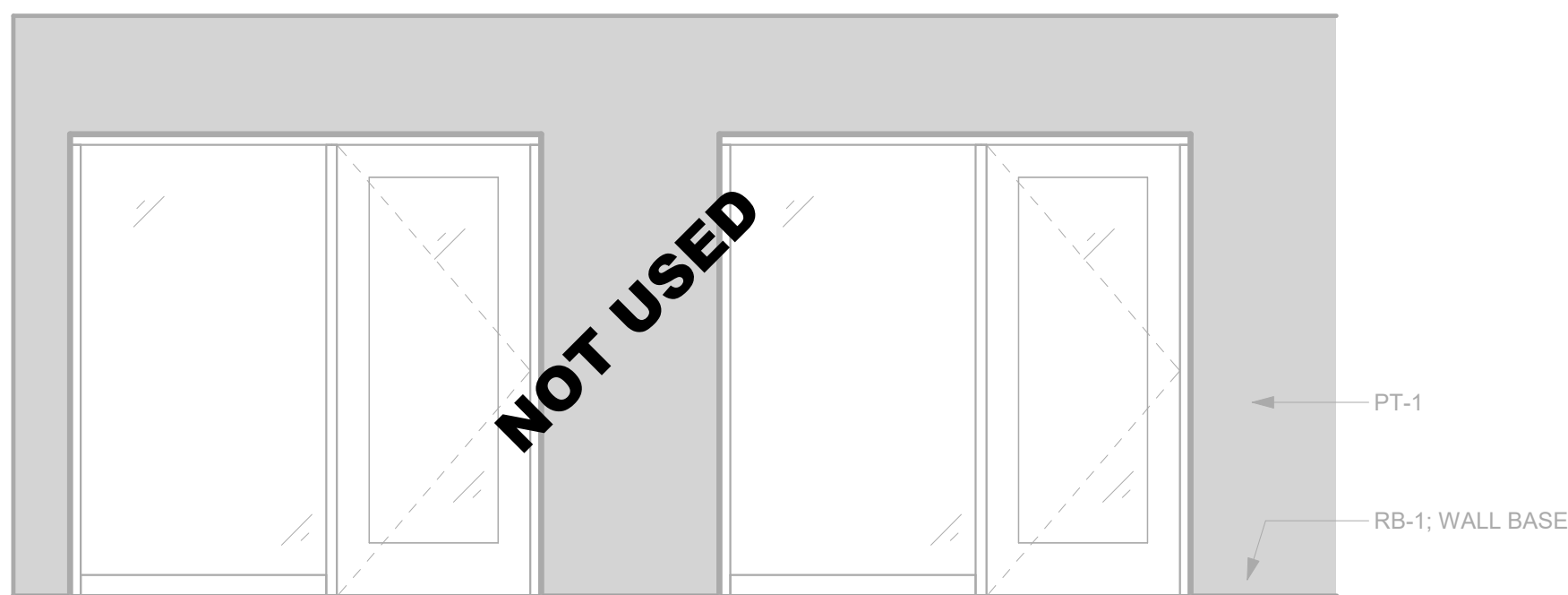
C1 TUTORING CENTER NORTH ENTRY
3/8" = 1'-0"



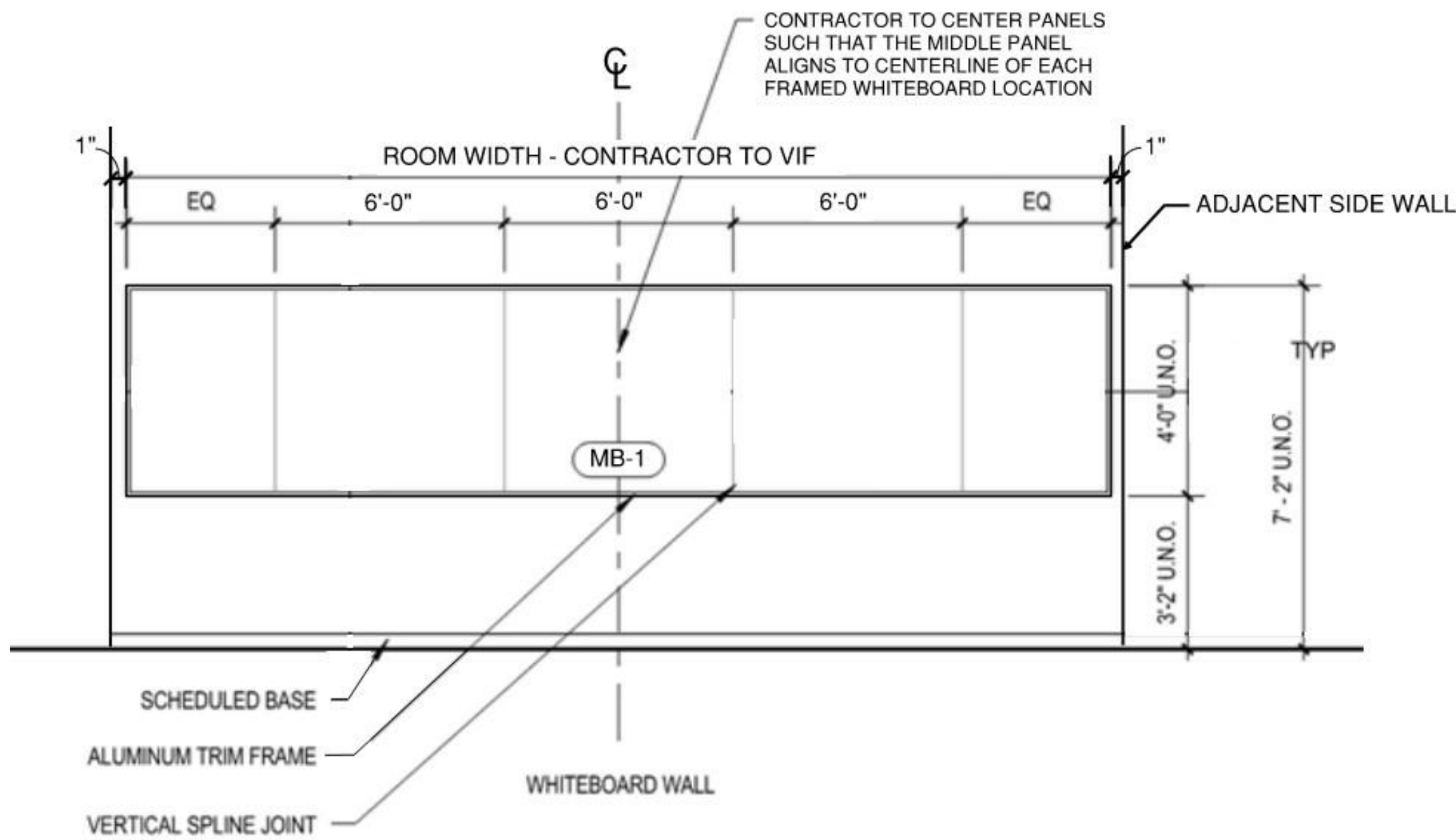
B3 STUDY RM 209 & 210
3/8" = 1'-0"



B2 OFFICE 205 & 206
3/8" = 1'-0"



B1 STUDY RM 201 & 202
3/8" = 1'-0"



A1 TYPICAL MARKERBOARD ELEVATION
3/8" = 1'-0"

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1	2023.12.01	PHASE 2 - ADDENDUM #1	SK	SK
2	2023.12.01	PHASE 2 - ADDENDUM #2	SK	SK
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NJICA REF NUMBER: 22031600

PROJECT NUMBER: 22031600

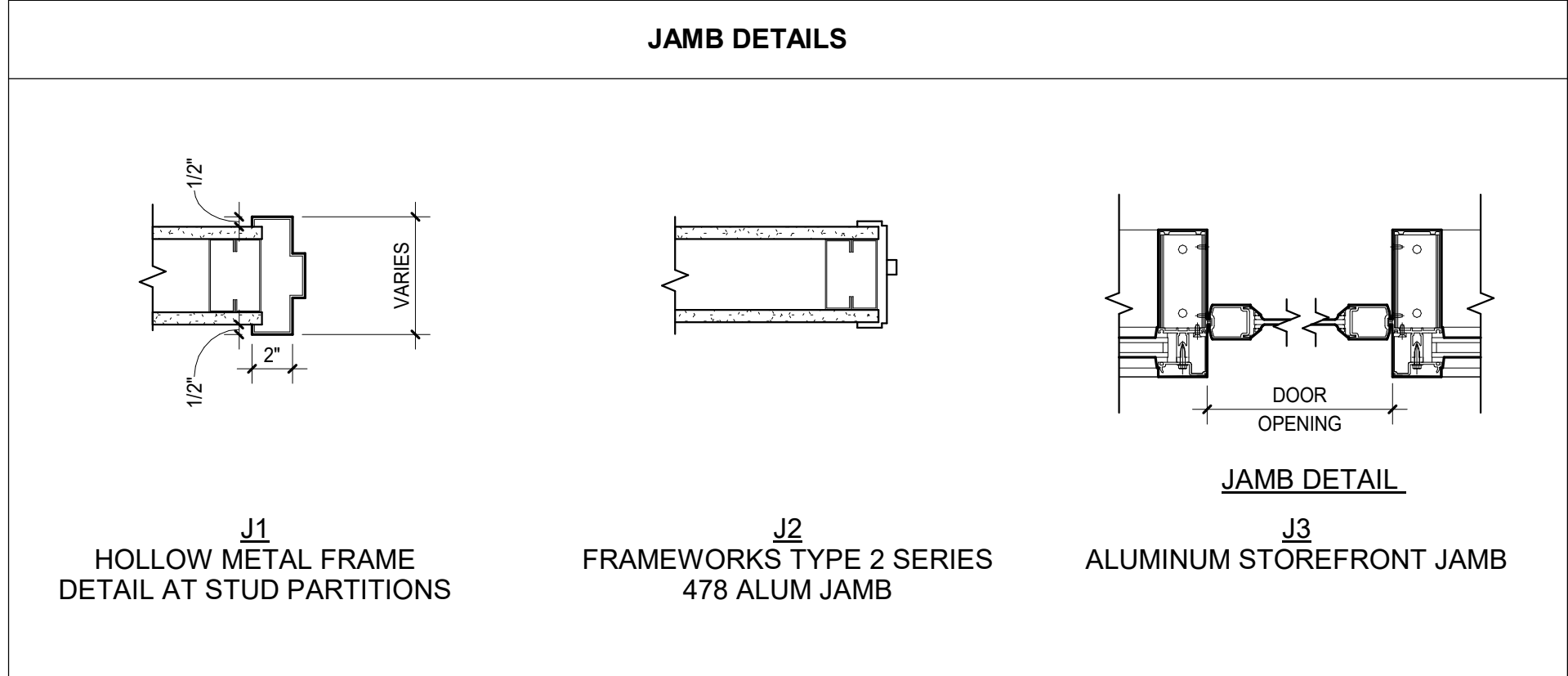
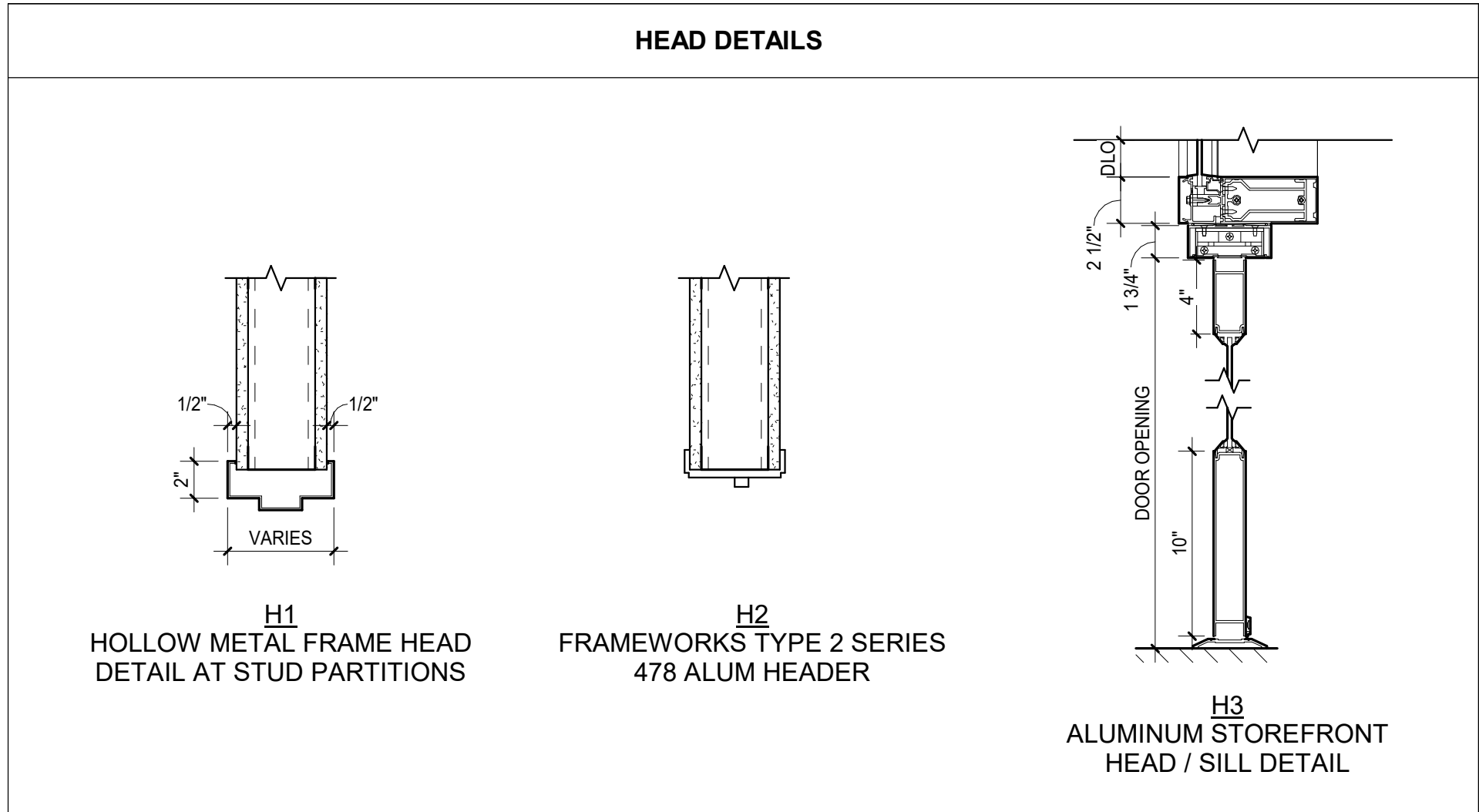
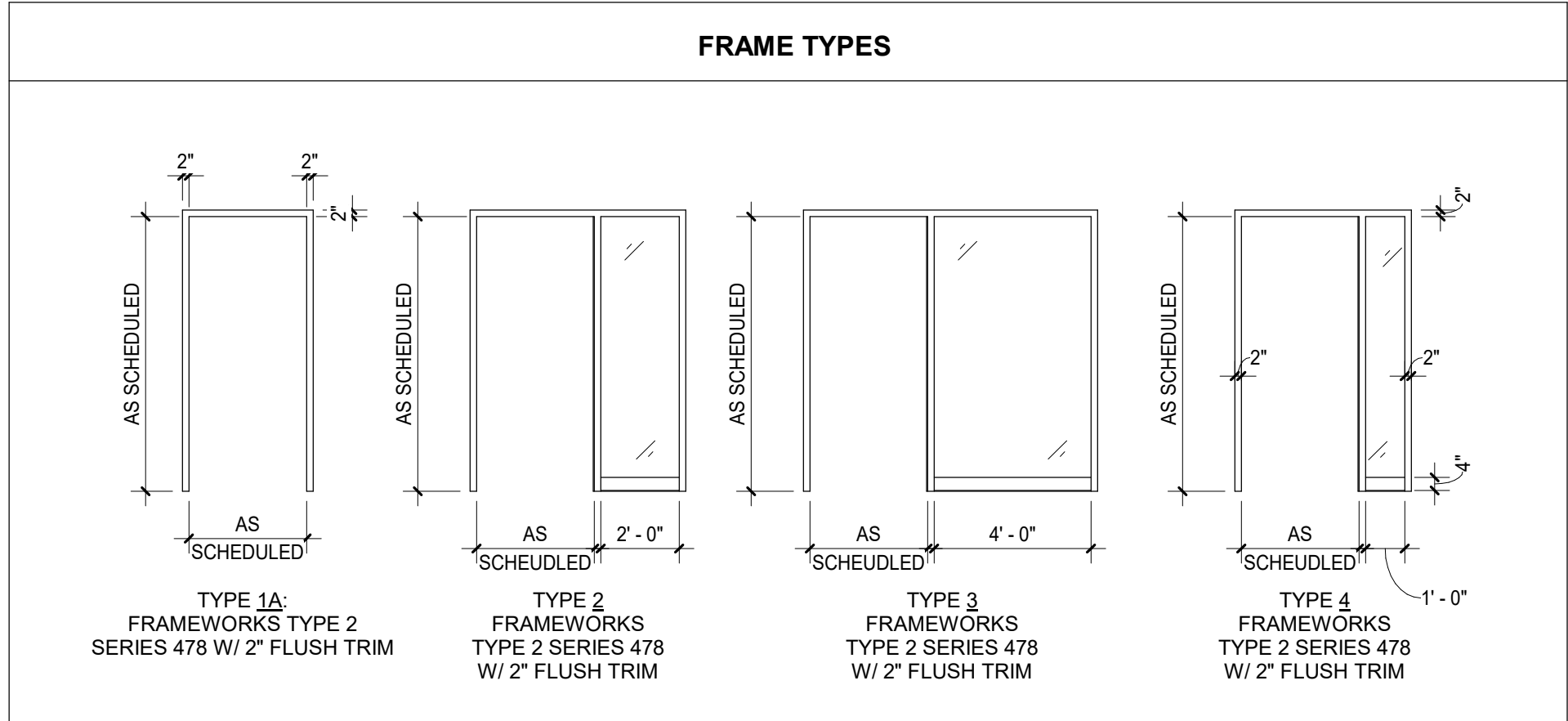
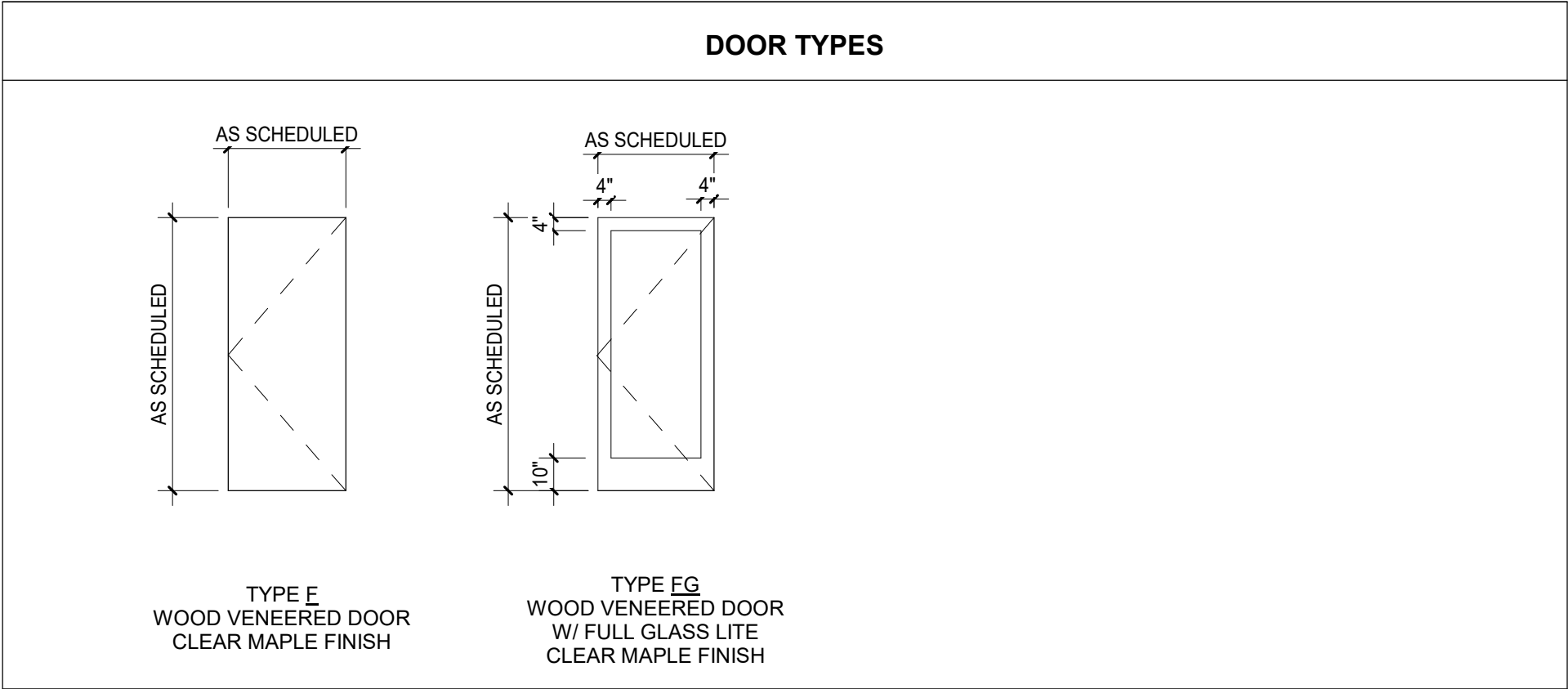
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SHEET TITLE

INTERIOR
ELEVATIONS

SHEET NUMBER

A602



DOOR SCHEDULE																	
DOOR #	TYPE	DOOR			GLASS	FRAME			DETAIL		HARDWARE SET	FIRE RATING (MIN)				COMMENTS	
		WIDTH	HEIGHT	THICKNESS		MATERIAL	TYPE	HEAD	JAMB	20		45	60	90	180		
Level 1																	
101	FG	3'-0"	7'-0"	1 3/4"	ALUM	Yes	ALUM	*	H2	J2	#01	<div>MODIFY DOOR HARDWARE FOR SINGLE DOOR (NOT DOUBLE). PROVIDE EXIT ONLY DECAL.</div>					
102	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	*	H2	J2	#02						
103	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#03						
104	FG	3'-2 1/8"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
105	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
108	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
109	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
110	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
111	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
112	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
113	F	3'-0"	7'-0"	1 3/4"	WD	No	ALUM	1A	H2	J2	#05						
115	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
116	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
120	F	3'-0"	7'-0"	1 3/4"	WD	No	ALUM	1A	H2	J2	#05						
121A.A	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#02						
121A.B	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#02						
121B.A	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#02						
121B.B	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#02						
122	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	*	H2	J2	#03						
122A	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM		H2	J2	#05						
123	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
124	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#03						
125	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#03						
126	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
127	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
130	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
131	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
132	(2)FG	6'-0"	7'-0"	1 3/4"	ALUM	Yes	ALUM		H2	J2	#01						
133	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
134	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
135	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#04						
136	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#04						
137	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#04						
138	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#04						
139	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#04						
141	F	3'-0"	7'-0"	1 3/4"	WD	No	ALUM	1A	H2	J2	#05						
142	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#03						
143	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#03						
144	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1A	H2	J2	#04						
145	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
146	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	2	H2	J2	#03						
148	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
149.A	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	*	H2	J2	#02						
149.B	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	*	H2	J2	#02						
151	(2)FG	6'-0"	7'-0"	1 3/4"	ALUM	Yes	ALUM	*	H2	J2	#01						
154	F	3'-0"	7'-0"	1 3/4"	WD	No	ALUM	1	H2	J2	#05	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
155	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#04	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
156	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
158	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
159	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
160	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
161	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
162	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
163	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
164	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
165	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	1	H2	J2	#03	ALT #1 - REPLACE EXISTING DOOR / FRAME WITH NEW (AS SCHEDULED HERE)					
166	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	*	H2	J2	#04						
168	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
169	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	3	H2	J2	#03						
170	FG	3'-0"	7'-0"	1 3/4"	WD	Yes	ALUM	4	H2	J2	#03						
Grand total: 60																	

Hardware Group No. 01 Entry (Panic Hardware)

Qty	Description	Catalog Number	Finish	Mfr
6	EA HINGE	58B1 4.5 X 4.5 NRP	652	IVE
2	EA PANIC HARDWARE	99-48-L-06 (CONCEALED VERTICAL ROD)	626	VON
2	EA SPIC RIM CYLINDER	80-159	626	SCH
2	EA PERMANENT CORE	1C7	626	BES
2	EA SURFACE CLOSER	4040XP EDA TBWMS	689	LCN
2	EA FLOOR/WALL STOP	FS17-26D	630	IVE
2	EA DOOR SEAL	188S-BK	S-Bk	ZER

Hardware Group No. 02 MULTIPURPOSE

Qty	Description	Catalog Number	Finish	Mfr
3	HINGE	58B1 4.5 X 4.5	652	IVE
1	CLASS ROOM LOCK	ML 2002 x NSA x MR w/ thumb turn on interior	626	CORBIN
1	PERMANENT CORE	1C7	626	BES
1	SURF CLOSER	4040XP TBWMS REG	689	LCN
1	FLOOR/WALL STOP	WS406/407CCV	630	IVE
1	DOOR SEAL	188S-BK	S-Bk	ZER

Hardware Group No. 03 OFFICES

Qty	Description	Catalog Number	Finish	Mfr
3	HINGE	58B1 4.5 X 4.5	652	IVE
1	OFFICE LOCK	ML 2054 x NSA x MR (F04)	626	CORBIN
1	PERMANENT CORE	1C7	626	BES
1	FLOOR/WALL STOP	FS17-26D	630	IVE
3	SILENCER	SR64	GRY	IVE

Hardware Group No. 04 PASSAGE

Qty	Description	Catalog Number	Finish	Mfr
3	HINGE	CB168		STANLEY
1	PASSAGE LOCK	ML2010 x NSA (F01)	626	CORBIN
1	FLOOR/WALL STOP	WS401/402 SERIES		ROCKWOOD
1	HEAD & JAMB SEALS	328A Jamb/428A Head		ZER
1	SILL SEAL/SWEEP	39A		ZER
3	SILENCER	SR64	GRY	IVE

Hardware Group No. 05 STORAGE

Qty	Description	Catalog Number	Finish	Mfr
3	HINGE	CB168		STANLEY
1	STORAGE LOCK	ML 2057 x NSA x MR (F07)	626	CORBIN
1	FLOOR/WALL STOP	WS401/402 SERIES		ROCKWOOD
1	HEAD & JAMB SEALS	328A Jamb/428A Head		ZER
1	SILL SEAL/SWEEP	39A		ZER
3	SILENCER	SR64	GRY	IVE

DOOR GENERAL NOTES

- ALL HOLLOW METAL FRAMES TO BE PAINTED TO MATCH ADJACENT WALL, U.N.O.
- TYPICAL WOOD DOORS TO BE GRADE 'A' MAPLE VENEER (FLAT CUT) W/ CLEAR COAT FINISH.
- LOCK CYLINDERS & REMOVABLE CORES TO BE COMPATIBLE WITH BUILDING STANDARD KEYING. COORDINATE HARDWARE & KEYING WITH TCNJ STANDARDS.
- REFER TO WALL TAGS ON ARCHITECTURAL PLANS FOR WALL THICKNESSES AT DOOR FRAMES.
- ALL ROUGH OPENING DIMENSIONS TO BE VERIFIED BY SUPPLIER PRIOR TO ORDERING DOORS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL DOOR STYLES WITH THEIR INTENDED AND SCHEDULED HARDWARE. PRIOR TO FABRICATING OR ORDERING ANY MATERIAL.
- ALL DOOR HARDWARE & SECURITY ITEMS TO BE COORDINATED FOR PROPER DOOR FUNCTION.
- CONTRACTOR SHALL PROVIDE COMPLETE DOOR HARDWARE SUBMITTALS FOR REVIEW.
- DOOR FORCES MUST COMPLY WITH NFPA 101 SECTION 7.2.1.4.5
- ALL DOOR HARDWARE SHALL BE ACCESSIBLE AND USE LEVER HANDLES (SINGLE ACTION RELEASE WITHOUT INTERIOR KEY LOCKS), COMPLYING W/ IBC CHAPTER 11.
- ALL RATED DOORS SHALL HAVE AUTO-CLOSERS. LOCKS SHALL NOT REQUIRE THE USE OF A KEY, A TOOL, OR SPECIAL KNOWLEDGE OR EFFORT FOR OPERATION FROM THE EGRESS SIDE.
- DOORS AND HARDWARE TO COMPLY WITH N.F.P.A. 101, SECTION 7.2.1, & I.B.C., SECTION 1008.
- ALL RATED DOORS SHALL HAVE MATCHING RATED ASSEMBLIES AND HARDWARE.
- ALL RATED DOORS AND ASSEMBLIES MUST BEAR INDEPENDENT LABORATORY RATING LABEL DISPLAYING THE TESTED RATING.
- EVERY CLOSET DOOR LATCH SHALL READILY OPEN FROM THE INSIDE IN CASE OF EMERGENCY.
- DOORS SHALL COMPLY WITH N.F.P.A. SECTION 101.5.2.1.5.1 (LOCKING DEVICES AT NEW DOORS).
- ALL DOOR THRESHOLDS SHALL COMPLY WITH I.B.C. CHAPTER 11.
- CONTRACTOR MUST PROVIDE TWO COPIES OF EACH KEY AS WELL AS A MASTER KEY FOR ALL DOORS. COORDINATE FINAL KEYING OF ALL DOORS WITH OWNER.
- CONTRACTOR TO DETERMINE ANY LOW POINT CONDITIONS AND EITHER PROVIDE OVERSIZED DOORS AND FIELD CUT OR FIELD MEASURE PRIOR TO FABRICATION TO DETERMINE ANY VARIATIONS NEEDED. DOORS WITH UNDERCUTS LARGER THAN 3/4" WILL BE REJECTED.
- ANY DOORS LARGER THAN 36" WIDE TO RECEIVE CONTINUOUS HINGES.
- ACCESS-CONTROL EGRESS DOORS MUST MEET THE PROVISIONS OF NFPA 101 SECTION 7.2.1.6.2 AND THESE PROVISIONS WHICH ARE APPLICABLE ONLY WHEN LOOKING FROM EGRESS SIDE.
 - SENSOR AUTOMATICALLY UNLOCKS DOOR UPON EGRESS OR LOSS OF POWER.
 - MANUAL RELEASE DEVICE WITHIN 5'-0" OF DOOR, AND LABELED "PUSH TO EXIT".
 - ACTIVATION OF BUILDING'S FIRE-PROTECTIVE FIRE ALARM SYSTEM UNLOCKS DOORS.
- ALL CARD READERS, STRIKE PLATES, REQUEST TO EXIT DEVICES, & POWER SUPPLIES TO BE PROVIDED AND INSTALLED BY OWNER'S SECURITY VENDOR. COORD. ALL REQUIRED TRADES.

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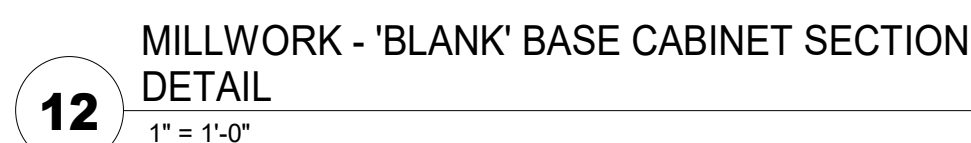
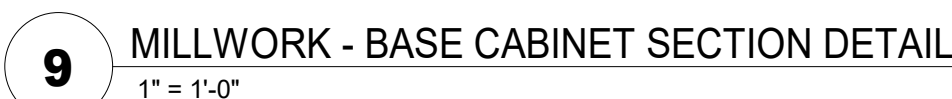
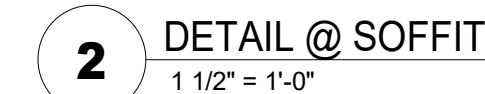
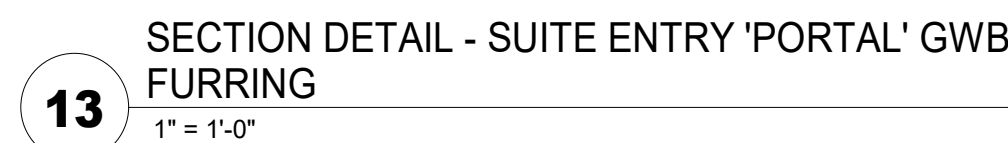
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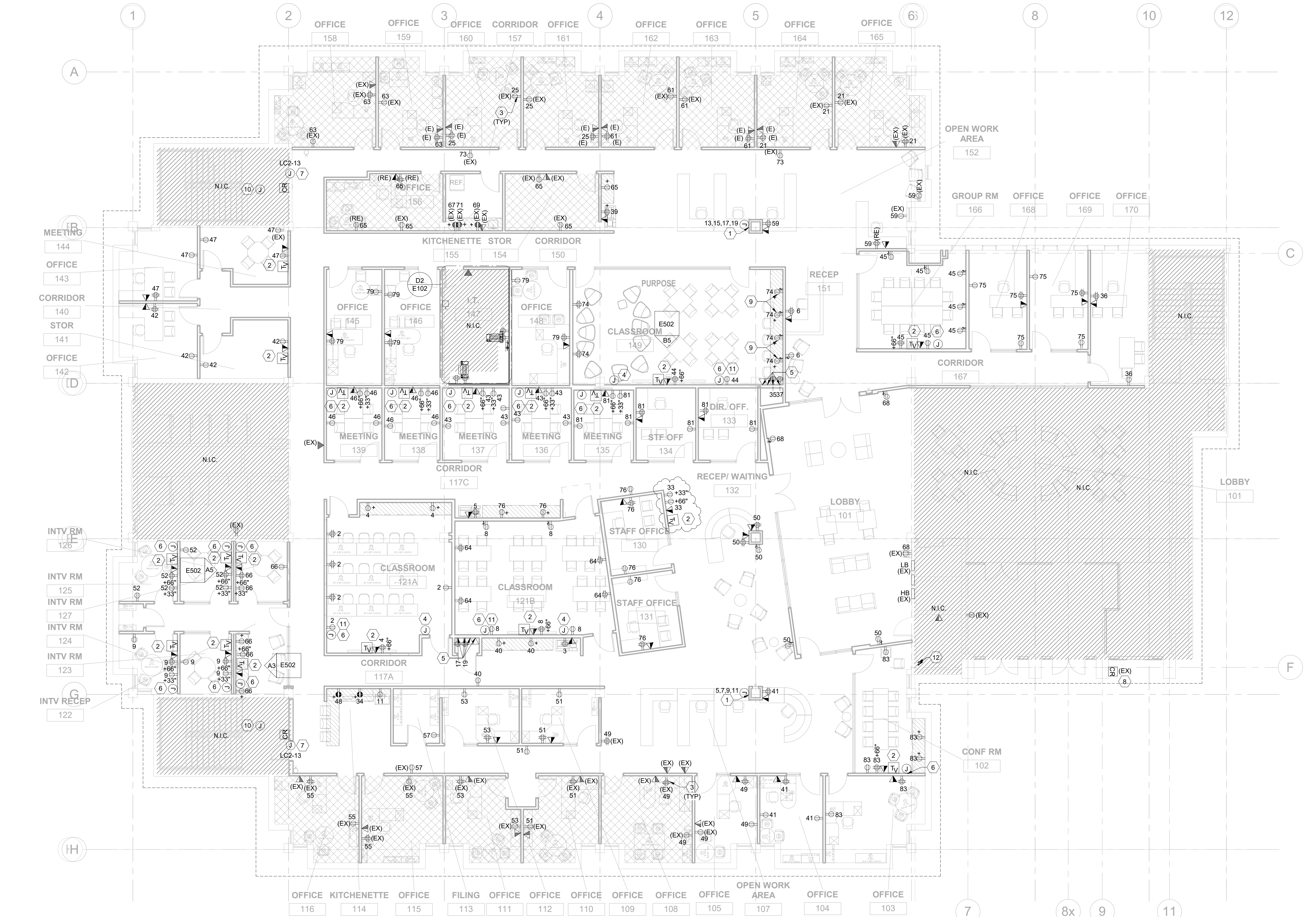
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REV	DATE	DESCRIPTION	BY	CHK
1	2023.12.01	PHASE 2 - ADDENDUM #1	GO	SK

NORR REF NUMBER:
PROJECT NUMBER: 22031600
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SHEET NUMBER:
A800



15 FIRST FLOOR POWER & SYSTEMS PLAN
1/8" = 1'-0"

GENERAL POWER NOTES

- A. FOR ELECTRICAL SYMBOLS, ABBREVIATIONS, REFER TO DRAWING E001.
- B. CONTRACTOR SHALL PROVIDE COMPLETE AND ACCURATE CIRCUIT DIRECTORIES FOR ALL NEW AND EXISTING PANELS AFTER NEW WORK IS COMPLETED.
- C. CONTRACTOR SHALL COORDINATE ALL TELECOMMUNICATION AND AUDIO/VISUAL PATHWAY REQUIREMENTS WITH DIVISION 27 CONTRACTOR AND SPECIFICATIONS. SEE AUDIO/VISUAL AND TELECOMMUNICATION DRAWINGS BY OTHERS FOR FURTHER INFORMATION; DEVICES SHOWN FOR COORDINATION ONLY.
- D. PROVIDE A JUNCTION BOX AND PULL STRING FROM EACH CARD READER/ELECTRIC DOOR STRIKE TO SECURITY EQUIPMENT RACK IN IDF ROOM. PROVIDE FIRE ALARM CONTACT AT SECURITY EQUIPMENT RACK FOR CARD READERS/ELECTRIC DOOR TO RELEASE UPON GENERAL ALARM OF FIRE ALARM SYSTEM.
- E. FIRE ALARM SHALL BE OPERATIONAL AND MAINTAINED DURING ALL ASPECTS OF DEMOLITION AND NEW CONSTRUCTION.
- F. MAINTAIN THE CONTINUITY OF ALL EXISTING TO REMAIN OUTSIDE THE SCOPE OF WORK AREA.
- G. ALL ELECTRICAL OUTLETS AND JUNCTION BOXES SHALL BE STAGGERED WITHIN THE WALL TO AVOID SOUND TRANSMISSION.
- H. ALL NEW FIRE ALARM DEVICES TO BE CONNECTED TO EXISTING FIRE ALARM SYSTEM. PROVIDE NEW WIRING AND CONDUIT TO ALL NEW FIRE ALARM DEVICES. NEW DEVICES SHALL MATCH EXISTING SYSTEM DEVICES. PROVIDE NEW BATTERIES, STROBE SYNC MODULES, HARDWARE, SOFTWARE, ETC AT THE FIRE ALARM CONTROL PANEL. NECESSARY TO SUPPORT NEW FIRE ALARM DEVICES.
- I. EXACT DEVICE LOCATIONS AND MOUNTING HEIGHTS SHALL BE DETERMINED BY FINAL FURNITURE PLANS, PROVIDED BY OWNER. COORDINATE WITH FURNITURE PLANS PRIOR TO ROUGH-IN.
- J. REFER TO TELECOMMUNICATIONS RESPONSIBILITY MATRIX IN DIVISION 1 SPECIFICATIONS FOR FURTHER INFORMATION REGARDING TELECOMMUNICATIONS, AUDIO-VIDEO, AND SECURITY SCOPE OF WORK. REFER TO DIVISION 27 DRAWINGS AND SPECIFICATIONS FOR INFORMATION REGARDING TELECOMMUNICATIONS GROUNDING, BONDING, AND RACEWAY REQUIREMENTS.
- K. EXISTING CABLING TO REMAIN THAT PASSES THROUGH NEW WALL PARTITIONS INSTALLED TO DECK SHALL BE INSTALLED THROUGH NEW RETROFIT SLEEVING ASSEMBLIES TO PENETRATE THE PARTITION. DISCONNECT, REROUTE, AND RECONNECT CABLING THROUGH RETROFIT SLEEVE. CABLING SHALL NOT BE EMBEDDED INTO DRYWALL. RETROFIT SLEEVING KIT SHALL BE ST1 SPEC SEAL READY SPLIT SLEEVE, 4".
- L. UNLESS OTHERWISE NOTED, ALL DEVICES ON THIS PLAN SHALL BE CIRCUITED TO PANEL 'LB'.

ELECTRICAL KEYNOTES

1. PROVIDE NEW RECESSED JUNCTION BOX FOR FURNITURE FEED, MOUNTED IN ACCESSIBLE LOCATION. FURNITURE IS ASSUMED TO BE 3+1 WIRING CONFIGURATION. VERIFY IN FIELD PRIOR TO CONSTRUCTION. PROVIDE (1) 2" OPENING FOR POWER AND (1) 2" OPENING FOR COMMUNICATION CABLING. PROVIDE UPSIZED NEUTRAL FOR MULTI-WIRE CIRCUITS, SIZED PER CODE. PAINT BOXES, FITTINGS, AND CONDUIT TO MATCH FINISHES SPECIFIED IN ARCHITECTURAL DRAWINGS.
2. PROVIDE DOUBLE DUPLEX RECEPTACLE AND 2X6" DATA JUNCTION BOX FOR DIGITAL DISPLAY, MOUNTED WITHIN WALL-BOX. WALL-BOX PROVIDED AND INSTALLED BY E.C. BLOCKING BY G.C. CONFIRM SPECIFICATIONS WITH DIVISION 27 CONTRACTOR PRIOR TO PURCHASE. PROVIDE 1-1/4" WITH PULLSTRING FROM WALL BOX UP TO ABOVE ACCESSIBLE CEILING. DATA, AV DEVICES AND CABLING BY OTHERS. VERIFY FINAL MOUNTING HEIGHTS WITH AVIT DRAWINGS PRIOR TO ROUGH-IN.
3. FOR LINE VOLTAGE DEVICES AND FIXTURES WITH DESIGNATION (EX), DEVICES SHALL RETAIN ORIGINAL CIRCUIT U.O.N. FOR EXISTING DEVICES TO BE RE-CIRCUITED, PROVIDE NEW FEEDERS AND CONDUIT AND PROVIDE NEW PANEL, CIRCUIT LABEL ON RECEPTACLE COVER PLATE.
4. PROVIDE 4"x5" RECESSED JUNCTION BOX FOR WALL-MOUNTED CAMERA, MOUNTED AT 6'-8" AFF. PROVIDE 1-1/4" WITH PULLSTRING FOR TELE-DATA AND AV UP TO ABOVE ACCESSIBLE CEILING. DATA AND AV CONNECTIONS AND CABLING BY DIVISION 27 CONTRACTOR.
5. PROVIDE (2) DOUBLE DUPLEX RECEPTACLES FOR AV EQUIPMENT RACK. (6) DATA DEVICES AND DATA CABLING BY OTHERS. CONFIRM MOUNTING HEIGHT PRIOR TO ROUGH-IN.
6. PROVIDE RECESSED 2-GANG 5" JUNCTION BOX FOR BUTTON CONTROL PANEL. PROVIDE 1" WITH PULLSTRING, STUBBED UP TO 8" ABOVE FINISHED CEILING. COORDINATE WORK WITH AVIT CONTRACTOR PRIOR TO ROUGH-IN.
7. PROVIDE 120V CONNECTION TO DOOR SECURITY HARDWARE. PROVIDE 1" WITH PULLSTRING FROM CARD READER TO DOOR HARDWARE CONNECTION. DOOR SHALL BE PROGRAMMED TO "FAIL-OPEN" IN EMERGENCY SITUATIONS; PROVIDE ALL POWER AND FIRE ALARM RELAYS REQUIRED FOR OPERATION. REFER TO DETAILS ON E501.
8. EXISTING CARD READER TO REMAIN IN PLACE.
9. ABOVE-COUNTER DEVICES TO BE INSTALLED FLUSH WITH SURFACE OF TACKABLE WALL PANEL COVERING. COORDINATE INSTALLATION WITH G.C.
10. PROVIDE CEILING-MOUNTED JUNCTION BOX AND 1" WITH PULLSTRING ABOVE EXISTING CEILING IN STAIRWELL FOR FUTURE SECURITY CAMERA. CONDUIT SHALL RUN TO AND TERMINATE ABOVE CEILING IN IT ROOM 147. COORDINATE FINAL TERMINATION LOCATION WITH DIVISION 27 CONTRACTOR PRIOR TO ROUGH-IN.
11. PROVIDE DUPLEX RECEPTACLE AND RECESSED 2-GANG 5" JUNCTION BOX FOR AV INPUT PANEL, CENTERED BELOW BUTTON CONTROL PANEL. PROVIDE 1" WITH PULLSTRING UP TO BUTTON CONTROL PANEL JUNCTION BOX ABOVE. COORDINATE WORK WITH AVIT CONTRACTOR PRIOR TO ROUGH-IN.
12. STUB UP NEW EMPTY CONDUIT WITH PULLSTRING FOR PANEL 'LB' TO 8'-6" ABOVE FINISHED FLOOR IN EXISTING TELEPHONE ROOM. CONTINUE NEW CONDUIT AND FEEDERS FOR PANEL 'LC' TO SECOND FLOOR ABOVE.

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SEAN P. PIC-KELL
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STUDENT SERVICES
RENOVATION**

2000 PENNINGTON ROAD EWING, NJ

THE COLLEGE OF NEW JERSEY

REV.	DATE	DESCRIPTION	BY	CHK
1	2023.12.01	PHASE 2 - ADDENDUM #1		
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NORR REF NUMBER:
PROJECT NUMBER: 22031600
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SHEET TITLE
**FIRST FLOOR
POWER &
SYSTEMS PLAN**

SHEET NUMBER
E101



- A. FOR ELECTRICAL SYMBOLS, ABBREVIATIONS, REFER TO DRAWING 001.
- B. CONTRACTOR SHALL PROVIDE COMPLETE AND ACCURATE CIRCUIT DIRECTORIES FOR ALL NEW AND EXISTING PANELS AFTER NEW WORK IS COMPLETED.
- C. CONTRACTOR SHALL COORDINATE ALL TELECOMMUNICATION AND AUDIOVISUAL PATHWAY REQUIREMENTS WITH DIVISION 27 CONTRACTOR AND PROVIDE SPECIFIC INFORMATION TO THE TELECOMMUNICATION DRAWINGS BY OTHERS FOR FURTHER INFORMATION; DEVICES SHOWN FOR COORDINATION ONLY.
- D. PROVIDE A JUNCTION BOX AND PULL STRING FROM EACH CARD READER/ELECTRIC DOOR STRIKE TO SECURITY EQUIPMENT RACK IN IDF ROOM. PROVIDE FIRE ALARM CONTACT AT SECURITY EQUIPMENT RACK FOR CARD READER/ELECTRIC DOOR TO RELEASE UPON GENERAL ALARM OF FIRE ALARM SYSTEM.
- E. FIRE ALARM SHALL BE OPERATIONAL AND MAINTAINED DURING ALL ASPECTS OF DEMOLITION AND NEW CONSTRUCTION.
- F. MAINTAIN THE CONTINUITY OF ALL EXISTING TO REMAIN OUTSIDE THE SCOPE OF WORK AREA.
- G. ALL ELECTRICAL OUTLETS AND JUNCTION BOXES SHALL BE STAGGERED WITHIN THE WALL TO AVOID SOUND TRANSMISSION.
- H. ALL NEW FIRE ALARM DEVICES TO BE CONNECTED TO EXISTING FIRE ALARM SYSTEM. PROVIDE NEW WIRING AND CONDUIT TO ALL NEW FIRE ALARM DEVICES. PROVIDE FIRE DEVICES SHALL MATCH EXISTING SYSTEMS. PROVIDE NEW BATTERIES, STROBE SYNC MODULES, HARDWARE, SOFTWARE, ETC AT THE FIRE ALARM CONTROL PANEL NECESSARY TO SUPPORT NEW SYSTEM.
- I. EXACT DEVICE LOCATIONS AND MOUNTING HEIGHTS SHALL BE DETERMINED BY FINAL FURNITURE PLANS, PROVIDED BY OWNER. COORDINATE WITH FURNITURE PLANS FIRST TO ROUGH-IN.
- J. REFER TO TELECOMMUNICATIONS RESPONSIBILITY MATRIX IN DIVISION 1 SPECIFICATIONS FOR FURTHER INFORMATION REGARDING TELECOMMUNICATIONS, AUDIO-VISUAL, AND SECURITY SCOPE OF WORK. REFERENCE TO DIVISION 27 SPECIFICATIONS FOR FURTHER INFORMATION REGARDING TELECOMMUNICATIONS GROUNDING, BONDING, AND RACEWAY REQUIREMENTS.
- K. EXISTING CABINET TO REMAIN THAT PASSES THROUGH NEW WALL PARTITION. INSTALL TO DECK SHALL BE INSTALLED THROUGH NEW WALL PARTITION. INSTALL TO DECK SHALL BE INSTALLED THROUGH NEW WALL PARTITION. DISCONNECT, REROUT, AND RECONNECT CABINET THROUGH RETROFIT SLIP. RETROFIT SLIP SHALL NOT BE EMBEDDED INTO DRYWALL. RETROFIT SLIP SHALL BE IN SPEC-SLIP READY SPLIT SLIP.

ELECTRICAL KEYNOTES	
1	PROVIDE 120V CIRCUIT FOR NEW VAV BOX CONTROL. CONNECT TO 240V TRANSFORMER AT VAV BOX. CONTROLS AND LOW VOLTAGE CONTROL WIRING BY OTHERS. PROVIDE ALL MONITORING MILES AND DUCT DETECTORS REQUIRED FOR FIRE ALARM SHUTDOWN AS REQUIRED BY AHPA. PROVIDE MONITORING MILES AND DUCT DETECTORS FOR ALL EXISTING VAV BOXES.
2	CONTRACTOR SHALL MAINTAIN FIRE ALARM AND ALL RELATED DEVICES IN WORKING ORDER DURING CONSTRUCTION. CONTRACTOR SHALL ADDRESS ANY TROUBLES OR ALARMS INITIATED DURING CONSTRUCTION. COORDINATE WITH FACILITIES FOR SHUTDOWN OF SYSTEM COMPONENTS WHERE REQUIRED.
3	ALL NEW VAV BOXES ARE CONTROLLED BY THE EXISTING MAIN BUILDING FIRE ALARM SYSTEM. CONTRACTOR SHALL MAINTAIN AND VERIFY ALL REQUIREMENTS WITH OWNER'S BUILDING ENGINEER AND MECHANICAL CONTRACTOR.
4	PROVIDE TOGGLE DISCONNECT SWITCH AND ALL REQUIRED CONTROL CIRCUITRY FOR NEW ELECTRIC WATER HEATER, MOUNTED IN COURT CENTER WITH MILLWORK. INSTALL DISCONNECT SWITCH IN ACCESSIBLE LOCATION. COORDINATE WITH DIVISION 22 CONTRACTOR.
5	NEW FIRE ALARM STROBES AND HORN/STROBES SHALL BE WHITE IN COLOR.

**ATTCNJ - ROSCOE HALL
STUDENT SERVICES
RENOVATION**

2000 PENNINGTON ROAD EWING, NJ

THE COLLEGE OF NEW JERSEY

SHEET NUMBER:
E301

Branch Panel: HB

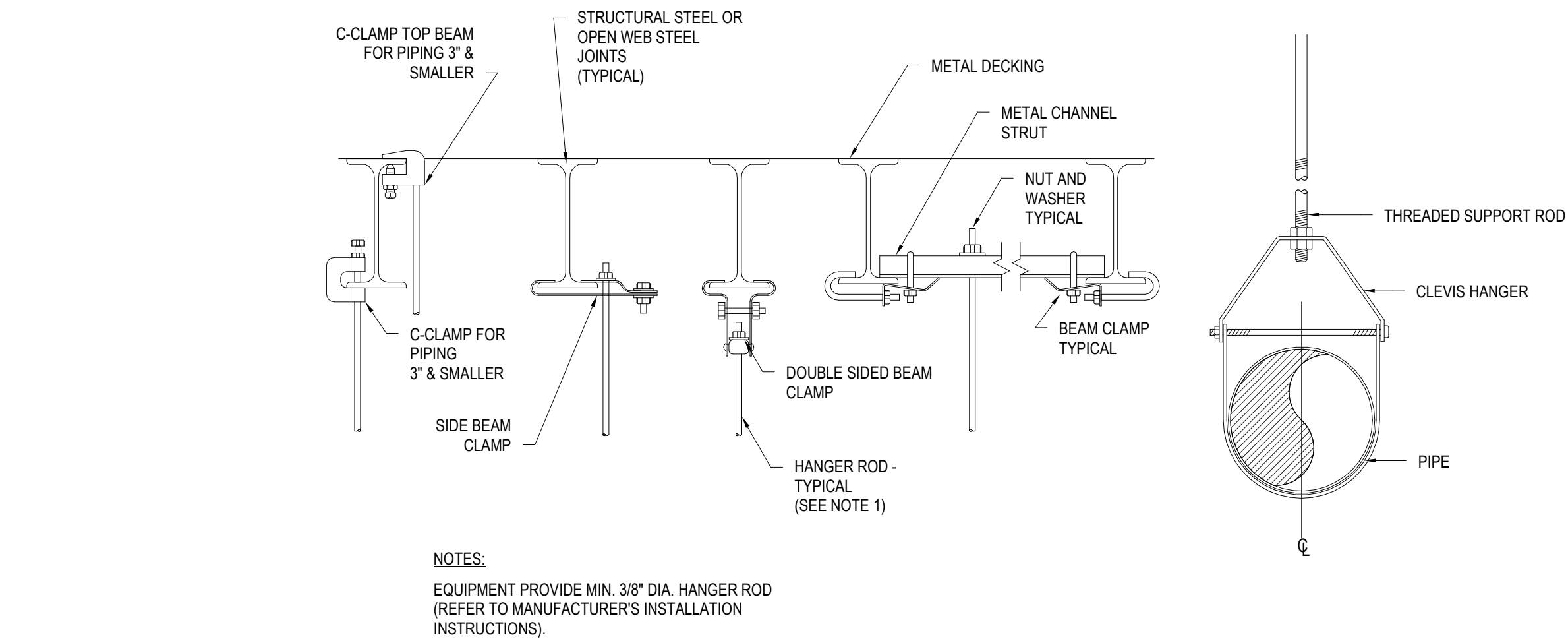
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Supply From:				Phases: 3				Mains Type: MLO				Feed Thru... No			
Mounting: Recessed				Wires: 4				MCB Rating: N/A				I.G. Bus: No			
Enclosure: Type 1								Bus Rating: 225 A							
CKT	Circuit Description	Rating	Pole	Wire Size	A		B		C		Wire Size	Pole	Rating	Circuit Description	CKT
1	LTG - 1ST FL OFFICES, MP...	20 A	1	1-#12, 1-#12, 1-#12	2.6 kVA/2.6 kVA						1-#12, 1-#12, 1-#12	1	20 A	LTG - 1ST FL OFFICES, MP...	2
3	LTG - 1ST FL CORRIDORS	20 A	1	1-#12, 1-#12, 1-#12			1.7 kVA/1.7 kVA				1-#12, 1-#12, 1-#12	1	20 A	LTG - 1ST FL LOBBY, OFFIC...	4
5	SPARE	20 A	1	--					0 kVA 0 kVA		--	1	20 A	SPARE	6
7	SPARE	20 A	1	--	0 kVA 0 kVA		0 kVA 0 kVA				--	1	20 A	SPARE	8
9	SPARE	20 A	1	--					0 kVA 0 kVA		--	1	20 A	SPARE	10
11	SPARE	20 A	1	--							--	1	20 A	SPARE	12
13	SPARE	20 A	1	--	0 kVA 0 kVA		0 kVA 0 kVA				--	1	20 A	SPARE	14
15	SPARE	20 A	1	--			0 kVA 0 kVA				--	1	20 A	SPARE	16
17	SPARE	20 A	1	--					0 kVA 0.9 kVA		--	1	20 A	(EX) LTG	18
19	(EX) LTG	20 A	1	--	2.9 kVA/3.4 kVA						--	1	20 A	(EX) LTG	20
21	(EX) LTG	20 A	1	--			2.3 kVA/2.8 kVA				--	1	20 A	(EX) LTG	22
23	(EX) LTG	20 A	1	--					2.4 kVA/0.1 kVA		--	1	20 A	(EX) LTG	24
25	(EX) UNIT VENT	20 A	1	--	1 kVA 1 kVA		1 kVA 1 kVA				--	1	20 A	(EX) HEATER	26
27	(EX) HEATER	20 A	1	--							--	1	20 A	(EX) HEATER	28
29	SPARE	20 A	1	--					0 kVA 0 kVA		--	1	20 A	SPARE	30
31	SPARE	20 A	1	--	0 kVA 0 kVA		0 kVA 0 kVA				--	1	20 A	SPARE	32
33	SPARE	20 A	1	--					0 kVA 0 kVA		--	1	20 A	SPARE	34
35	SPARE	20 A	1	--					0 kVA 0 kVA		--	1	20 A	SPARE	36
37	SPARE	20 A	1	--	0 kVA 0 kVA						--	1	20 A	SPARE	38
39	SPARE	20 A	1	--			0 kVA 0 kVA				--	1	20 A	SPARE	40
41	SPARE	20 A	1	--					0 kVA 0 kVA		--	1	20 A	SPARE	42
Total Load:					13.52 kVA		10.4 kVA		3.4 kVA						
Panel Totals															
Total Conn. Load: 27.36 kVA															
Total Conn. Current: 33 A															
Notes:															
EXISTING PANEL TO REMAIN. ALL NEW (N) LOADS SHALL BE ON EXISTING BREAKERS U.O.N.															
PROVIDE TYPED PANEL SCHEDULES WITH FIELD-VERIFIED LOADS AT JOB COMPLETION.															
* = NEW BREAKER, MATCH EXISTING AIC RATINGS.															

Branch Panel: LB

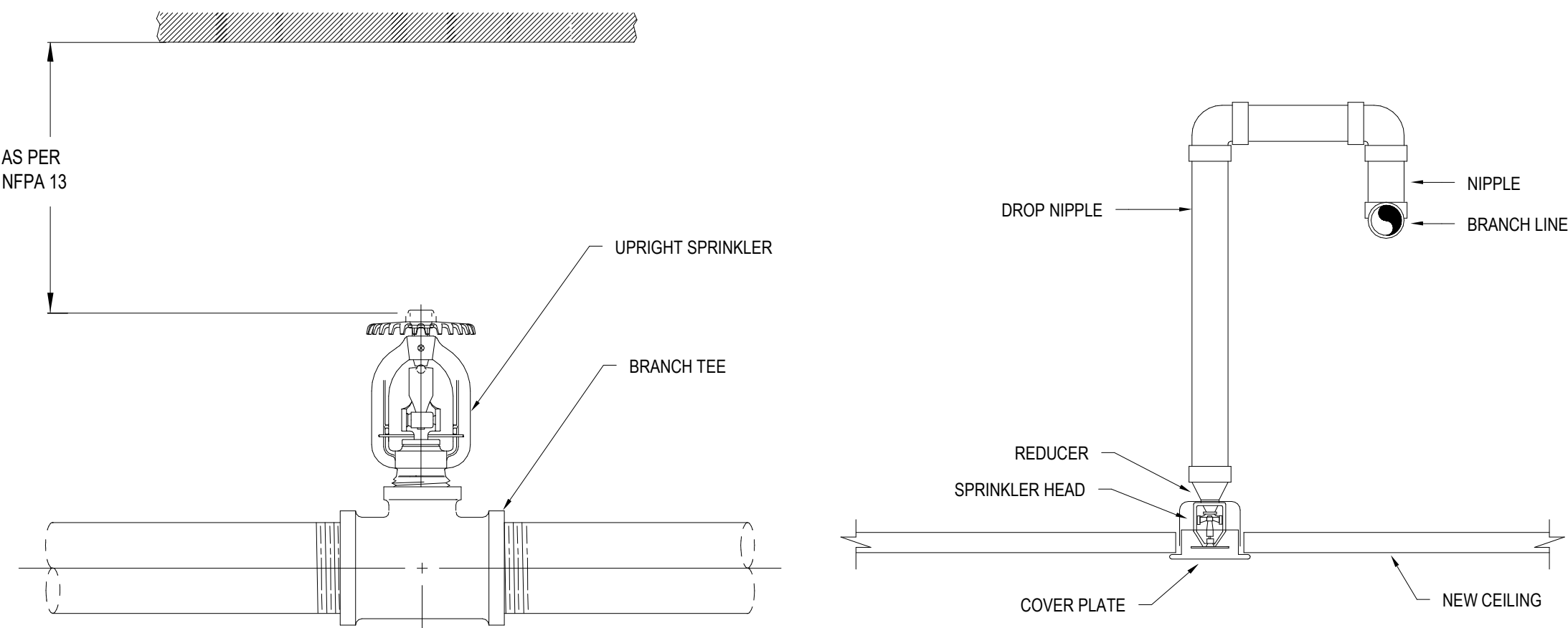
Location:		Volts: 120/208 Wye		A.I.C. Rating: 10,000 AIC, MN		Neutral Rating: 100%							
Supply From:		Phases: 3		Mains Type: MCB		Feed Thru... No							
Mounting: Recessed		Wires: 4		MCB Rating: 200 A		I.G. Bus: No							
Enclosure: Type 1				Bus Rating: 200 A									
CKT	Circuit Description	Rating	Pole	Wire Size	A	B	C	Wire Size	Pole	Rating	Circuit Description	CKT	
1	VAV CTRLS - 1ST FL	20 A	1	1-#12, 1-#12, 1-#12	0.3 kVA/1.4 kVA			1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - MP 119A	2	
3	COPPER - CORRIDOR 117	20 A	1	1-#12, 1-#12, 1-#12		0.4 kVA/0.7 kVA		1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - CLASS 121A	4	
5	COPPER - CORRIDOR 91	20 A	1	1-#12, 1-#12, 1-#12			0.4 kVA/0.5 kVA	1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - RECEPTION 151	6	
7	SPARE	20 A	1	--	0 kVA	1.1 kVA		1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - MP 119B	8	
9	RCPTLS - INTV 121, 122...	20 A	1	1-#12, 1-#12, 1-#12		1.4 kVA	3 kVA	1-#12, 1-#12, 1-#12	1	20 A	*BHW - KITCHENETTE 152	10	
11	REFR - KITCHEN 65	20 A	1	1-#12, 1-#12, 1-#12			0.2 kVA	3 kVA	2-#8, 1-#8, 1-#10	2	40 A	*BHW - KITCHENETTE 152	12
13	*BHW - KITCHENETTE 65	40 A	2	2-#8, 1-#8, 1-#10	3 kVA	1.2 kVA		1-#12, 1-#12, 1-#12	1	20 A	++FF1 - OPEN WORK 107	14	
15	AV1 - MP 119B	20 A	1	1-#12, 1-#12, 1-#12		3 kVA	1.2 kVA	1-#12, 1-#12, 1-#12	1	20 A	++FF2 - OPEN WORK 107	16	
17	AV2 - MP 119B	20 A	1	1-#12, 1-#12, 1-#12	0.4 kVA/1.2 kVA		0.4 kVA/1.2 kVA	1-#12, 1-#12, 1-#12	1	20 A	++FF3 - OPEN WORK 107	18	
19	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12, 1-#12		1.1 kVA	0 kVA	--	1	20 A	++FF4 - OPEN WORK 107	20	
21	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12, 1-#12			0 kVA	0 kVA	--	1	20 A	(EX) BATTERY UNITS	22
23	(EX) ELEVATOR LGT	20 A	1	--				1-#12, 1-#12, 1-#12	1	20 A	(EX) LTG	24	
25	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12, 1-#12	1.1 kVA/1.2 kVA			1-#12, 1-#12, 1-#12	1	20 A	++FF1 - OPEN WORK 140	26	
27	RCPTL - IT RM 3	20 A	1	1-#12, 1-#12, 1-#12		0.4 kVA/1.2 kVA		1-#12, 1-#12, 1-#12	1	20 A	++FF2 - OPEN WORK 140	28	
29	SPARE	20 A	1	--			0 kVA	1.2 kVA	1-#12, 1-#12, 1-#12	1	20 A	++FF3 - OPEN WORK 140	30
31	RCPTL - IT RM 4	20 A	1	1-#12, 1-#12, 1-#12	0.4 kVA/1.2 kVA			1-#12, 1-#12, 1-#12	1	20 A	++FF4 - OPEN WORK 140	32	
33	(REC - TV RECEPTION)	20 A	1	1-#12, 1-#12, 1-#12		0.4 kVA/0.2 kVA		1-#12, 1-#12, 1-#12	1	20 A	COFFEE MAKER - KITCHEN 65	34	
35	AV1 - CLASS 149	20 A	1	1-#12, 1-#12, 1-#12			0.4 kVA/0.5 kVA	1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - OFFICE 166	36	
37	AV2 - CLASS 149	20 A	1	1-#12, 1-#12, 1-#12	0.4 kVA	0 kVA		--	1	20 A	SPARE	38	
39	COPPER - OPEN WORK 149	20 A	1	1-#12, 1-#12, 1-#12		0.4 kVA/0.5 kVA		1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - CORRIDOR 117	40	
41	RCPTLS - OFFICES 105, 104	20 A	1	1-#12, 1-#12, 1-#12			1.6 kVA/0.9 kVA	1-#12, 1-#12, 1-#12	1	20 A	RCPTLS - OFFICE 139, STOR...	42	
43	RCPTLS - MTG 134, 135	20 A	1	1-#12, 1-#12	1.4 kVA/0.5 kVA			1-#12, 1-#12	1	20 A	RCPTLS - CLASS 149	44	
45	RCPTLS - GROUP RM 163	20 A	1	1-#12, 1-#12		1.4 kVA/1.4 kVA		1-#12, 1-#12	1	20 A	RCPTLS - MTG 136, 137	46	
47	RCPTLS - MEETING 138	20 A	1	1-#12, 1-#12			1.1 kVA/0.2 kVA	1-#12, 1-#12	1	20 A	MICROWAVE - KITCHEN 65	48	
49	(E) RCPTLS - OFFICE 108	20 A	1	1-#12, 1-#12	1.8 kVA/1.3 kVA			1-#12, 1-#12	1	20 A	FLOOR BOXES - RECEPTION 130	50	
51	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12		1.3 kVA/1.4 kVA		1-#12, 1-#12	1	20 A	RCPTLS - INTV 123, 124, 125	52	
53	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12			1.1 kVA/0.2 kVA	--	1	20 A	(EX) RCPTL - MENS RM	54	
55	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12	1.1 kVA/0.4 kVA			--	1	20 A	(EX) RCPTL - COPY/FILE	56	
57	RCPTLS - FILING 113	20 A	1	1-#12, 1-#12		0.4 kVA	0 kVA	--	1	20 A	SPARE	58	
59	(E) RCPTLS - OPEN WORK 149	20 A	1	1-#12, 1-#12			1.1 kVA/0.4 kVA	1-#12, 1-#12	1	20 A	(EX) RCPTL - IT RM 1	60	
61	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12	1.1 kVA/0.4 kVA			1-#12, 1-#12	1	20 A	(EX) RCPTL - IT RM 2	62	
63	(E) RCPTLS - OFFICES...	20 A	1	1-#12, 1-#12		1.1 kVA/1.4 kVA		1-#12, 1-#12	1	20 A	RCPTLS - MP 119B	64	
65	(E) RCPTLS - STOR 151...	20 A	1	1-#12, 1-#12			1.3 kVA/1.3 kVA	1-#12, 1-#12	1	20 A	Receptacle INTV RM 127	66	
67	(E) MICROWAVE - KITCHEN...	20 A	1	1-#12, 1-#12	0.2 kVA/0.7 kVA			1-#12, 1-#12	1	20 A	RCPTLS - LOBBY 100	68	
69	(E) COFFEE MAKER	20 A	1	1-#12, 1-#12		0.2 kVA	2 kVA	--	2	20 A	(EX) HTR - RM 103	70	
71	(E) REFR - KITCHEN 152	20 A	1	1-#12, 1-#12			0.2 kVA	2 kVA	--	2	20 A	(EX) HTR - RM 103	72
73	(E) RCPTLS - CORRIDORS	20 A	1	1-#12, 1-#12	0.4 kVA/1.4 kVA			1-#12, 1-#12	1	20 A	RCPTLS - MP 146	74	
75	RCPTLS - OFFICE 164, 165	20 A	1	1-#12, 1-#12		1.4 kVA/1.6 kVA		1-#12, 1-#12	1	20 A	RCPTLS - OFFICES 128, 129	76	
77	SPARE	20 A	1	--		0 kVA	0 kVA	--	1	20 A	SPARE	78	
79	RCPTLS - OFFICE 142, 143, 145	20 A	1	1-#12, 1-#12	1.6 kVA	0 kVA		--	1	20 A	SPARE	80	
81	RCPTLS - MTG 133, OFFICE...	20 A	1	1-#12, 1-#12		1.8 kVA	0 kVA	--	1	20 A	SPARE	82	
83	RCPTLS - OFFICE 103, CON...	20 A	1	1-#12, 1-#12			1.6 kVA	0 kVA	--	1	20 A	SPARE	84
Total Load:					25.01 kVA	29.3 kVA	20.5 kVA						
Panel Totals													
Total Conn. Load: 74.85 kVA													
Total Estd. Demand Load: 54.44 kVA													
Total Conn. Current: 208 A													
Total Estd. Demand Current: 151 A													
Notes:													
EXISTING PANEL TO REMAIN. ALL NEW (N) LOADS SHALL BE ON EXISTING BREAKERS U.O.N.													
PROVIDE TYPED PANEL SCHEDULES WITH FIELD-VERIFIED LOADS AT JOB COMPLETION.													
* = NEW BREAKER, MATCH EXISTING AIC RATINGS													
++ = PROVIDE HANDLE-TIES FOR BREAKER GROUP.													
NOTE: PANEL SCHEDULE FOR 'LB' INCLUDES CIRCUITS FOR PHASE I AND PHASE II WORK. REFER TO PLANS FOR SCOPE OF WORK IN EACH PHASE.													

Branch Panel: HC

Location:				Volts: 480/277 Wye				A.I.C. Rating: 25,000 AIC, MIN				Neutral Rating: 100%			
Supply From:				Phases: 3				Mains Type: MLO				Feed Thru... No			
Mounting: Recessed				Wires: 4				MCB Rating: N/A				I.G. Bus: No			
Enclosure: Type 1								Bus Rating: 125 A							
CKT	Circuit Description	Rating	Pole	Wire Size	A	B	C	Wire Size	Pole	Rating	Circuit Description	CKT			
1	(EX) LTG	20 A	1	--	2.6 kVA/1.2 kVA			--	1	20 A	(EX) LTG	2			
3	(EX) LTG	20 A	1	--		3.8 kVA/1.4 kVA		--	1	20 A	(EX) LTG	4			
5	(EX) LTG	20 A	1	--	3.3 kVA/3.3 kVA		4.2 kVA/4.2 kVA	--	1	20 A	(EX) LTG	6			
7	(EX) LTG	20 A	1	--				--	1	20 A	(EX) LTG	8			
9	LTG - 2ND FL STUDY AREA	20 A	1	1#12, 1#12, 1#12		1 kVA/3.3 kVA		--	1	20 A	(EX) LTG	10			
11	(EX) LTG	20 A	1	--			3.5 kVA/6.6 kVA	--	1	20 A	(EX) LTG	12			
13	LTG - 2ND FL STUDENT...	20 A	1	1#12, 1#12, 1#12	0.3 kVA/0 kVA			--	1	20 A	SPARE	14			
15	SPARE	20 A	1	--		0 kVA/0.7 kVA		--	1	20 A	(EX) LTG	16			
17	(EX) LTG	20 A	1	--			3.1 kVA/0 kVA	--	1	20 A	SPARE	18			
19	(EX) LTG	20 A	1	--	2.6 kVA/2.6 kVA			--	1	20 A	(EX) LTG	20			
21	(EX) LTG	20 A	1	--		3.9 kVA/1.1 kVA		--	1	20 A	(EX) LTG	22			
23	(EX) LTG	20 A	1	--			1.7 kVA/0.8 kVA	--	1	20 A	(EX) LTG	24			
25	(EX) LTG	20 A	1	--	1.9 kVA/0 kVA			--	1	20 A	SPARE	26			
27	(EX) LTG	20 A	1	--		0.9 kVA/1.6 kVA		--	1	20 A	(EX) LTG	28			
29	SPARE	20 A	1	--			0 kVA/2.2 kVA	--	1	20 A	(EX) LTG	30			
31	SPARE	20 A	1	--	0 kVA/1 kVA			--	1	20 A	(EX) UNIT VENT	32			
33	(EX) UNIT VENT	20 A	1	--		1 kVA/1 kVA		--	1	20 A	(EX) UNIT VENT	34			
35	(EX) HEATER	20 A	1	--			1 kVA/1 kVA	--	1	20 A	(EX) HEATER	36			
37	(EX) HEATER	20 A	1	--	1 kVA/1 kVA			--	1	20 A	(EX) HEATER	38			
39	SPARE	20 A	1	--		0 kVA/2.1 kVA		--	1	20 A	(EX) LTG	40			
41	SPARE	20 A	1	--			0 kVA/0 kVA	--	1	20 A	SPARE	42			
Total Load:					20.91 kVA	21.9 kVA	28.3 kVA								
Panel Totals															
Total Conn. Load: 71.13 kVA															
Total Conn. Current: 86 A															
Notes:															
EXISTING PANEL TO REMAIN. ALL NEW (N) LOADS SHALL BE ON EXISTING BREAKERS U O N.															
PROVIDE TYPED PANEL SCHEDULES WITH FIELD-VERIFIED LOADS AT JOB COMPLETION.															
= NEW BREAKER, MATCH EXISTING AIC RATINGS.															



1 PIPE HANGER DETAIL
NTS



2 UPRIGHT SPRINKLER DETAIL
NTS

3 CONCEALED SPRINKLER TYPE DETAIL
NTS

- GENERAL NOTES
- THESE GENERAL NOTES ARE APPLICABLE TO ALL FIRE PROTECTION DRAWINGS.
 - THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND SHOW THE GENERAL INTENT OF WORK. SEE DETAILS, RISERS, AND SPECIFICATION FOR ADDITIONAL INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR A COMPLETE SYSTEM FOR FULL BUILDING COVERAGE. ADDITIONAL SPRINKLERS AND PIPING MAY BE REQUIRED TO ACCOMMODATE CONDITIONS SUCH AS SOFFITS, DUCTWORK, STRUCTURE, LIGHTING, EQUIPMENT, BOOK STACKS, ETC. THE CONTRACTOR SHALL PROVIDE A COMPLETE SPRINKLER INSTALLATION IN CONFORMANCE WITH NFPA 13, NFPA 14, FEDERAL AND STATE CODES AND THEIR APPLICABLE SUPPLEMENTS, AND THE REQUIREMENTS OF THE OFFICE OF THE STATE FIRE MARSHAL.
 - REFER TO NFPA 13 FOR EXACT SPACING, DENSITY, AND LOCATION REQUIREMENTS. CONTRACTOR SHALL INSTALL QUICK RESPONSE TYPE SPRINKLER IN ENTIRE BUILDING. USE OF EXTENDED COVERAGE, QUICK RESPONSE, TYPE SPRINKLER MAY BE USED WITH THE APPROVAL OF THE AUTHORITY HAVING JURISDICTION.
 - SPRINKLERS IN FINISHED LAYIN TILE CEILING AREAS SHALL ALWAYS BE LOCATED IN THE CENTER OF CEILING TILES UNLESS INDICATED OTHERWISE.
 - REVIEW THE ARCHITECTURAL, REFLECTED CEILING, ELEVATION AND SECTION PLANS AS PART OF THIS CONTRACT FOR ADDITIONAL INFORMATION SUCH AS CEILING HEIGHTS, TYPES, SOFFITS AND OR OTHER DEVICE LOCATIONS.
 - REVIEW THE ELECTRICAL DIVISION DRAWINGS AND COORDINATE THE FIRE PROTECTION WORK WITH LOCATIONS OF LIGHT, AND CEILING MOUNTED DEVICES WHICH MAY INTERFERE WITH SPRINKLER LOCATIONS OR SPRAY PATTERNS.
 - REVIEW THE HVAC DIVISION DRAWINGS AND COORDINATE THE FIRE PROTECTION WORK WITH LOCATIONS OF CEILING MOUNTED DEVICES SUCH AS DIFFUSERS, GRILLS, REGISTERS, AND ALSO THE LOCATIONS OF HEAT PRODUCING EQUIPMENT AND DUCTWORK REQUIRING SPRINKLER PROTECTION BELOW IT.
 - PROVIDE PIPE EXPANSION JOINTS ALL BUILDING EXPANSION JOINT LOCATIONS AND EXPANSION LOOPS AT ALL BUILDING EXPANSION/SEISMIC JOINT LOCATIONS AS REQUIRED PER NFPA 13 AND BUILDING CODES. REVIEW ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR EXACT LOCATIONS OF EXPANSION AND SEISMIC JOINTS. SEISMIC SEPARATION ASSEMBLIES SHALL BE INSTALLED WHERE SPRINKLER PIPING, REGARDLESS OF SIZE, CROSSES BUILDING SEISMIC SEPARATION JOINTS ABOVE GROUND LEVEL IN ACCORDANCE WITH NFPA 13.20. PROVIDE U.L. LISTED SWING JOIN ASSEMBLIES (METRAFLEX FIRELOOP,) WHERE SPRINKLER PIPING CROSSES BUILDING EXPANSION JOINTS. 21. PIPING, PIPE HANGERS AND SUPPORTS SHALL BE PROVIDED WITH SEISMIC RESTRAINT BRACING PER NFPA 13, STATE AND LOCAL REQUIREMENTS.
 - PERFORM A FLOW TEST WITNESSED BY A REPRESENTATIVE OF THE OFFICE OF THE AUTHORITY HAVING JURISDICTION, OWNER, ARCHITECT, ENGINEER, DATA RECORDED AT THE TIME OF THIS FLOW TEST SHALL INCLUDE: DATE OF TEST, TIME OF TEST, WITNESSES PRESENT, ALL PARTIES SHALL BE NOTIFIED OF THE DATE AND TIME OF THE TEST PRIOR TO ANY FUTURE FLOW TESTS. THE CONTRACTOR SHALL USE THE FLOW DATA FROM THIS TEST FOR HIS/HER HYDRAULIC CALCULATIONS. REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
 - ALL PIPE SIZES SHOWN ON THE CONTRACT DOCUMENTS ARE ADEQUATELY SIZED FOR THE NEW SPRINKLER SYSTEM. THE PIPE SIZES SHOWN ARE SUBJECT TO CHANGE UPON THE COMPLETION OF THE FIRE PROTECTION CONTRACTOR'S HYDRAULIC CALCULATIONS.
 - MAKE PROVISIONS FOR DRAINING THE ENTIRE SYSTEM PER NFPA 13.
 - PROVIDE SPRINKLER LAYOUT SHOP DRAWINGS, SEISMIC BRACING CALCULATION AND HYDRAULIC CALCULATIONS SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT. THESE DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO AND APPROVED BY AN AUTHORITY HAVING JURISDICTION AND OWNER'S INSURANCE CARRIER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL PROVIDE COPIES OF AN AUTHORITY HAVING JURISDICTION AND OWNER'S INSURANCE CARRIER'S APPROVALS WITH THEIR SHOP DRAWING SUBMITTAL.
 - UNOCCUPIED SPACES WITHOUT CEILINGS SHALL BE PROVIDED WITH UPRIGHT SPRINKLERS.
 - SPRINKLERS SHALL BE INSTALLED UNDER FIXED OBSTRUCTIONS OVER 4 FEET (1.2M) WIDE PER NFPA 13. THE CONTRACTOR SHALL VERIFY ALL DUCTWORK DIMENSIONS IN THE FIELD AND INSTALL SPRINKLERS AS REQUIRED.
 - VERIFY THE DISTANCE BETWEEN CEILING AND BOTTOM OF STRUCTURAL BEAMS IN ALL AREAS WITH REFLECTIVE CEILINGS.
 - ALL HORIZONTAL PIPING SHALL BE LOCATED ABOVE THE CEILING OR IN SOFFIT SPACES UNLESS NOTED OTHERWISE.
 - VERIFY AND COORDINATE VALVE IDENTIFICATION REQUIREMENTS WITH OWNER STANDARDS IN THE FIELD.
 - FLOW AND TAMPER SWITCHES SHALL BE PROVIDED WHERE INDICATED; ALL WIRING SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR. ALL WORK SHALL BE COORDINATED BETWEEN TRADES IN THE FIELD.
 - SPRINKLER PROTECTION SHALL BE REQUIRED IN ALL ELECTRICAL EQUIPMENT AND COMMUNICATION ROOMS, ETC. SPRINKLER HOODS OR SHIELDS SHALL BE INSTALLED TO PROTECT IMPORTANT ELECTRICAL EQUIPMENT FROM SPRINKLER DISCHARGE. HOODS/SHIELDS SHALL BE OF A NON-COMBUSTIBLE MATERIAL. SPRINKLER SHALL NOT BE REQUIRED WHERE ALL THE FOLLOWING CONDITIONS ARE MET:
 - THE ROOM IS DEDICATED TO ELECTRICAL EQUIPMENT ONLY.
 - ONLY DRY TYPE ELECTRICAL EQUIPMENT IS USED.
 - ELECTRICAL EQUIPMENT IS INSTALLED IN A 2 HOUR, FIRE RATED, ENCLOSURE INCLUDING PROTECTION OF PENETRATIONS.
 - NO COMBUSTIBLE STORAGE IS PERMITTED TO BE STORED IN THE ROOM.
 - THE SPRINKLER EQUIPMENT ROOM AND FIRE PROTECTION EQUIPMENT COMPONENTS (E.G. VALVES, PIPING, TAMPER SWITCHES, FLOW ALARMS, ECT.) SHALL REQUIRE PROPER IDENTIFICATION AS PER THE REQUIREMENT OF NFPA13.
 - THE SUBMISSION OF AUTOMATIC FIRE SUPPRESSION (SPRINKLER) SYSTEM SHOP DRAWINGS (E.G. INFORMATION RELATIVE TO SPRINKLERS, FITTINGS, CHECK VALVES, EXPOSURE TO HAZARDS, EXTENT OF SYSTEM COVERAGE, SUPPRESSION SYSTEM DESIGN CRITERIA, WATER SUPPLY SOURCE, SUPPLY AND EXTINGUISHING AGENTS, LOCATION AND METHOD OF OPERATION FOR DETECTION AND ALARM DEVICES, ECT.) SHALL BE REQUIRED FOR REVIEW AND EVALUATION AS PER IBC, 2009; THE STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS (NFPA-13) AND THE HUD MAP CHAPTER 5 GUIDELINES.
 - SPRINKLERS ARE REQUIRED IN CONCEALED SPACES PER NFPA 13 SECTION 8.15.1
 - CONTRACTOR SHALL COORDINATE HEAD TYPE WITH ARCHITECTURAL CEILING PLANS.
 - CONTRACTOR SHALL PROVIDE SPRINKLER HEADS ABOVE AND BELOW DUCT AND CEILING CLOUDS AS REQUIRED BY NFPA.
 - TYPICAL NEW SPRINKLER HEADS WITHIN SCOPE OF WORK TO BE CONCEALED TYPE WITH WHITE EXCUTION PLATES. SPRINKLER HEADS AT AREAS OF EXPOSED CEILING TO BE UPRIGHT TYPE.

FIRE PROTECTION CONSTRUCTION PROCEDURES

- IT IS SOLELY THE FIRE PROTECTION CONTRACTOR'S RESPONSIBILITY TO OBTAIN APPROVAL OF SHOP DRAWINGS FROM THE OWNERS INSURANCE CARRIER AND THE AUTHORITY HAVING JURISDICTION. ANY INSTALLATION OF THE SPRINKLER SYSTEM WITHOUT APPROVED PLANS SHALL BE AT THE SOLE RISK AND EXPENSE OF THE CONTRACTOR.
- THE FIRE PROTECTION CONTRACTOR MUST CONTACT THE OWNERS CONSTRUCTION COORDINATOR AND REQUEST WHENEVER THE SPRINKLER MAIN IS TO BE ISOLATED AND/OR DRAINED. THIS PROCEDURE MUST BE ADHERED TO WHEN PRESSURE TESTING AND/OR PLACING ANY PORTION OF SYSTEM IN OR OUT OF SERVICE.
- THE OWNER'S CONSTRUCTION COORDINATOR AND THE AUTHORITY HAVING JURISDICTION SHALL WITNESS ALL SYSTEM PRESSURE TESTS. CONTRACTOR MAKING THE TEST SHALL PROVIDE 24 HOURS NOTICE TO ALL REQUIRED TO BE IN ATTENDANCE.
- ALL WORK SHALL MEET THE REQUIREMENTS OF NFPA STANDARDS. INSTALLATION PROCEDURES SHALL COMPLY WITH THE SAFETY RULES OF OSHA AND THE STATE OF PENNSYLVANIA FIRE SAFETY CODE.
- THE FIRE PROTECTION CONTRACTOR MUST PROVIDE A FIRE WATCH WHENEVER ANY WELDING IS DONE WITHIN THE AREA BEING WORKED, DURING THE WELDING OPERATION, AND FOR ONE HOUR AFTER WELDING IS COMPLETE.
- NO STOCK OF FURNISHINGS SHALL BE ALLOWED IN THE AREAS BEING WORKED UNTIL THE ENTIRE SYSTEM IS COMPLETED IN ACCORDANCE WITH THE ABOVE NOTES AND APPROVED BY THE AUTHORITY HAVING JURISDICTION.
- PROVIDE A MATERIAL TEST AND CERTIFICATION FORM TO THE AUTHORITY HAVING JURISDICTION AND OWNER'S INSURANCE CARRIER SO AS TO CERTIFY THAT THE SPRINKLER SYSTEM WAS INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, SPECIFICATIONS, FEDERAL, STATE, AND LOCAL CODES AND PROCEDURES.
- UPON COMPLETION OF SYSTEM INSTALLATION, PERFORM A HYDROSTATIC TEST ON ALL PIPING AND ATTACHED APPURTENANCES IN THE PRESENCE OF AN AUTHORITY HAVING JURISDICTION. THE SYSTEM SHALL BE HYDROSTATIC ALLY TESTED AT A PRESSURE OF 200 PSI AND SHALL MAINTAIN THAT PRESSURE WITHOUT LOSS FOR 2 HOURS. TEST FAILURE SHALL BE DETERMINED BY A DROP IN GAUGE PRESSURE OR VISUAL LEAKAGE. THE TEST PRESSURE SHALL READ FROM A GAUGE LOCATED AT THE LOWEST ELEVATION POINT OF THE SYSTEM OR PORTION BEING TESTED. ALL TESTING THE SYSTEM SHALL BE IN ACCORDANCE WITH NFPA 13 AND NFPA 25.
- CONSTRUCTION PHASING OF THE PROJECT, THE EXISTING AREAS OF FIRE PROTECTION MUST BE MAINTAINED. THE FIRE PROTECTION CONTRACTOR IS TO PROVIDE SERVICE TO THESE AREAS FROM THE NEW FIRE PROTECTION SERVICE AS REQUIRED.

SPRINKLER SYSTEM DESIGN CRITERIA SYMBOLS

SYSTEM TYPE	AREA	HAZARD	AREA OF SCOPE
	SYSTEM TYPE	HAZARD	HAZARD CLASSIFICATION
	DENSITY	MIN. AREA	REMOTE DESIGN AREA
	SPR. TEMP	MAX. SP. HD	MAXIMUM SQ.FT. / SPRINKLER

FIRE PROTECTION SHEET LIST

FP-001	COVERSHEET
FP-101	FIRE PROTECTION FIRST FLOOR PLAN

LEGEND

FIRE SERVICE PIPING	_____ F _____
SPRINKLER PIPING	_____ SPR _____
FIRE PUMP TEST HEADER PIPING	_____ FPTH _____
FIRE DEPARTMENT CONNECTION PIPING	_____ FDC _____
STANDPIPE	_____ WSP _____
COMBINATION SPRINKLER / STANDPIPE	_____ SPR/WSP _____
DRY STANDPIPE	_____ DSP _____
ALARM CHECK VALVE W/ SUPERVISORY SWITCH.	VALVE GATE BALL
DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)	BACKFLOW PREVENTION DEVICE
EXISTING SPRINKLER	FIRE DEPARTMENT CONNECTION
EXISTING SIDE WALL TYPE SPRINKLER	CAPPED OUTLET
SIDE WALL TYPE SPRINKLER	CHECK VALVE
CONCEALED SIDE WALL SPRINKLER	PRESSURE GAUGE
PENDENT TYPE SPRINKLER	WATER TIGHT PIPE SLEEVE
CONCEALED TYPE PENDENT SPRINKLER	PIPE BREAK
UPRIGHT TYPE SPRINKLER	PIPE DROP
DRY TYPE SPRINKLER	PIPE UP OR DOWN
REMOVE EXISTING SPRINKLER	FIRE HOSE VALVE

D

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PROJECT TEAM

C

B

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THE COLLEGE OF NEW JERSEY

A

DESCRIPTION
PHASE 2 - ADDENDUM 1

NUCCA REF NUMBER:
PROJECT NUMBER: 22031600
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SHEET NUMBER
COVERSHEET

SHEET NUMBER

FP-001