

The contents of this Addendum alter and amend the drawings and specifications and take precedence over the related items therein. Bidders shall include the cost of all items in their Bids.

**GENERAL INFORMATION**

1. Based on scope of work proposed by Victory after last inspection, PC shall include the following in its bid:
  - a. Remove and replace two (2) outdated gauges on the fire sprinkler riser with new gauges.
  - b. Furnish and install missing fill cup for dry valve.

**CLARIFICATIONS:**

1. Alternate G-01 scope of work to include painting of all primary roof fasciae and soffits. Base bid exterior painting scope to include all exterior trim, moldings, casings and columns from eave dentil molding down to grade.

**REQUESTS FOR INFORMATION:**

- #82 Please provide capacity or run-time specification for generator sub-base fuel tank. Moreover, please provide guidance with respect to EC responsibility for providing fuel if any.

*A: Paragraph 2.3(B) in specifications requires generator to be classified Class 48 which by NFPA 110 is a 48 hour runtime. EC shall provide Owner will a full tank on the date of substantial completion.*

- #83: Please help clarify the scope of exterior painting work: 1. Does the existing exterior trim, noted as 2.01.12 on A-202, get painted in either the base bid or the alternate? 2. Do the columns, 2.01.20 on A-202, and the main entry door surrounding trims get painted? 3. Alt G-01 seems to indicate the existing soffit only at the dormers gets repainted. Does any of the existing soffit on the remainder of the building get painted in the base bid or alternate?

*A: All exterior trim from white dentil molding downwards gets cleaned and painted including decorative moldings, casings and columns. Cleaning of soffits should be included in general façade cleaning and considered part of base bid. Existing soffits, fasciae and leaders are color matched to siding; painting of all roof soffits, leaders, gutters and fasciae shall be included in Alternate G-01.*

- #84: 1) Drawings indicate new 2-1/2" domestic water service. Typically, the plumber connects at a location 5' outside the building. Please confirm full work scope for the plumber related to the new service as desired.

2) Is a meter pit required, and if so, please denote location.

3) Current spec denotes type L copper for under slab. Please advise if this is correct.

4) Please confirm the correct materials desired to be used for new water service, if provided by the plumber.

5) Please provide location of the utility tie-in point for the new water connection / service. This is not shown on the drawings.

*A: The plumber is responsible to connect to site piping 5 feet outside of building and all plumbing work within the building. Under slab domestic water piping shall be Type K copper piping. Site*

*work shall be by site Contractor as specified by site Engineer. Meter pit would be provided by GC if necessary. Water service upgrade scope will be clarified in next Addendum.*

#85: Please advise how the plumber is to keep the existing systems online during construction. We would think that temporary water could be provided but not fixtures and or drainage. Assume that the GC would be responsible for temporary toilets during construction.

A: *Plumber is not responsible for keeping domestic water active during construction but is responsible for temporary water. The plumber is not responsible for temporary toilets, that is by GC.*

#86: 1) Gas connection point is shown at existing gas meter. Plumber is unsure if there is any work related to the meter upgrade or the underground gas service upgrade. Please advise what work is the responsibility of the plumber.

2) Confirm that the plumber is not responsible for any work related to the upgraded site gas service and or excavation for same

A: *The Plumber is not responsible for upgrading the site gas service or trenching for gas.*

#87: 1) Are both Finish Schemes in Spec Section 090600A required to be priced?

2) Provide information for 12.48.01 indicated on A-704 at Vest 100.

3) Are stair elevations available for accurate tread and riser counts?

A: 1) *Bidder may furnish specified products from either finish scheme, but may not mix vendors within the product category (i.e. – Tile scheme must be A or B, not partially A and partially B).*

2) *Basis of design products and alternate manufacturers are included in Keynote: "NEW RECESSED ALUMINUM-FRAMED, ROLL-OUT WALK-OFF MAT WITH ABRASIVE CARPET INSERTS. FINISH AND INSERT COLOR AS SELECTED BY ARCHITECT FROM MANUFACTURERS FULL LINE. REPLACE PERIMETER TRIM AND PROVIDE ANCHORAGES PER MANUFACTURER SPEC. BASES OF DESIGN: NYSTROM/BABCOCK DAVIS "Roll-Up GRATEdesign" (3/4" RECESS) OR NYSTROM "QuietFLEX" (3/8" RECESS). VERIFY EXISTING FLOOR RECESS PRIOR TO SELECTION. ALTERNATE MANUFACTURERS: 1) C-S GROUP, 2) AMARCO." If more specific information is required, please submit follow question.*

3) *Stairs are depicted in As-Built Architectural drawings provided on PennBid, sheet A-5. Please review those drawings and confirm against field observations.*

#88: 1) My supplier is asking for a profile of the wall caps for the retaining and handicap ramps i didn't see anything but only notes about it's sizes.

2) I just want to confirm the interior walls in the existing building are not getting grouted.

3) In the new addition; the interior walls are getting grouted every 2' but only 16" high as noted as 6/S300

4) The 40' wall divider between the sally port and evidence room is getting grouted like the exterior walls as seen as 5/S300

- A: 1) Square edge, 14" wide x 2" high with single slope to outside face of wall.  
2) Interior CMU walls may use same detail as 6/S300.  
3) Grout only needs to extend to above rebar as shown in 6/S300. Grout shown above that elevation is erroneous.  
4) Correct. This wall is load bearing and requires the vertical reinforcing as shown in detail 5/S300.

#89: I was looking over the Bid Documents from Addendum #3 is that all that is needed for the bid or are we still using the rest of the bid documents from the specs as well. All that was included in addendum #3 is pages 1-4 Bid Form. But on the regular bid form in the specs there are allowances, Unit Price & Alternates. Please advise when you can.

- A: All monetary bids, unit prices, allowances, alternates shall be submitted using the PennBid Bid Tables. The document in Addendum #3 REPLACES the original bid form. All other requested documents are still required.

#90: 1) Reference: 23 8129, VRF System, Condensate Drain Piping: Confirm that PVC, schedule 40 can be used and if so, does it need to be insulated?  
2) Reference 23 0700 HVAC Insulation, 3.14, piping insulation schedule: clarify thickness per pipe sizes? The chart seems to be missing pipe sizes, on the right side, upper row.

- A: 1) Specification section 238129, Section 2.14 states if more than one material is listed, material selection is Contractor's option and then goes on to list Copper, CPVC and PVC as acceptable materials.  
2) Specification section 230700 Section 3.14 Piping Insulation Schedule: Table to be updated as follows to include the missing pipe sizes. All condensate piping regardless of material is to be insulated per this table.

	FLUID TEMPERATURE RANGE (DEG F)	INSULATION CONDUCTIVITY BTU-IN/(HR-FT <sup>2</sup> -F)	PIPE SIZE AND INSULATION THICKNESS (INCHES) (Note 4)				
			<1	1 to <1-1/2	1-1/2 to <4	4 to < 8	≥ 8
Indoor Condensate Drains (Note 1, 2)	40-60	0.21 – 0.27	0.5	0.5	1.0	1.0	1.0
Refrigerant (Note 1)	Less than 40	0.20 – 0.26	0.5	1.0	1.0	1.0	1.5

NOTE 1: (P), (A), OR (SS) FIELD-APPLIED JACKET ON OUTDOOR INSTALLATIONS, EXPOSED AND CONCEALED.

NOTE 2: VAPOR BARRIER REQUIRED.

#91: 1) We don't see any depressed slabs at FT-2 locations on the structural drawings. Could you confirm these areas (F124A & shower in 119) are getting depressed?  
2) Are the showers in 121 prefab or are they meant to get floor and wall tile?  
3) Is wall tile required behind lockers in Rooms 119 and 121 or should these walls only receive cove base?  
4) We see specifications for High performance cement grout meeting ANSI A118.7 in the tile spec but all the TNCA installation methods are specifying Epoxy grout. Is High performance grout acceptable or is Epoxy grout required for all tile on this project?  
5) Reference ceramic tile note 5 on drawing A-704. Where is tile being installed over existing

surfaces? Is this a reference to existing masonry or block walls? Are any of these existing Masonry or block walls painted?

- A: 1) ***At roll-in tile shower in 119:*** GC may either A) build up sloped slab from 119 floor drain to edge of shower at appx. 1% to built-up bedding area in shower or B) create a 1.5"-2" deep slab depression within the boundaries of the shower. Shower floor slope should be 1/4" per 1'-0" minimum. Drain to be centrally located in shower (differs from current plumbing dwgs).  
***At shower in room 134,*** provide a 3' wide x 4' deep sump sloped to floor drain.  
***At shower 125A,*** build-up floor to slope to trench drain at front of alcove.  
2) Showers in 121 are prefab cabins. Note that ADA shower requires ADA threshold and will require coordination with tile setter to ensure compliant threshold dimensions.  
3) Wall tile not required behind lockers. Cove base acceptable. Provide shims behind lockers to match thickness of cove base. Terminate wainscot at face of locker filler panels with vertical edge profile.  
4) High-performance polymer grout acceptable.  
5) 1<sup>st</sup> floor: Some gypsum partitions remaining around Stair 1 that will require backer board. See also TR 102. No existing CMU anticipated to be tiled. 2<sup>nd</sup> Floor: See around Elevator and wall between gang TR's and Storage 219.

#92: I see that the Bidder Acknowledgement Form is listed as a requirement to upload for Bid. However, I do not see the PDF form list in the Supporting Documents section of this project.

A: *Distributed as part of Addendum 3.*

#93: Will there be an annunciator panel added to the main entrance?

A: *Yes. Annunciator panel will be located in Lobby 101 per revised drawing E-10 OR at other location to be confirmed by AHJ.*

#94: Spec Section 011200 Multiple Contract Summary has both the General Contractor and HVAC Contractor installing equipment curbs. Please clarify who is responsible for supplying and installing equipment curbs.

A: *Curbs to be provided by HVAC contractor. HVAC contractor shall coordinate roof penetrations for curbs with GC. GC shall frame out roof curb penetrations, install curbs and flash them into roof system.*

#### **DRAWINGS:**

**A-001:** Drawing index updated.

**M-1:** New Work Notes 11 & 12 added re: condensate routing.

**M-4:** Condensate pipe routing added.

**M-5:** Condensate pipe routing added.

**M-8:** Electric Ceiling Heater Schedule added.

**E-1:** Signal legend revised.

**E-6:** Signal/power items revised/added throughout floor plan.

**E-7:** Signal/power items revised/added throughout floor plan.

**E-8:** Power revised to Vestibule 100 electric ceiling heater unit.

**E-10:** Fire Alarm Annunciator added to Lobby 101.

**E-13:** Panel Schedules updated.

**E-14:** Panel Schedule updated.

**FP-1:** Sprinkler demo scope notes added.

**FP-2:** Sprinkler demo scope notes added.

**FP-3:** Sprinkler new work scope notes added.

**FP-4:** Sprinkler new work scope notes added.

**SPECIFICATIONS**

1. **ADDED Section 270500 "Common Work Results for Communications Systems."**
2. **ADDED Section 271513 "Communications Copper Horizontal Cabling."**
3. **ADDED Section 270500 "Communications Coaxial Horizontal Cabling."**

**REQUESTS FOR SUBSTITUTION:**

None.

**END.**  
**MG ARCHITECTS, LTD.**

SOG/lev

Attachments:

- Specification section 270500 "Common Work Results for Communications Systems."
- Specification section 271513 "Communications Copper Horizontal Cabling."
- Specification section 270500 "Communications Coaxial Horizontal Cabling."
- Updated Drawings:
  - A-001
  - M-1
  - M-4
  - M-5
  - M-8
  - E-1
  - E-6
  - E-7
  - E-8
  - E-10
  - E-13
  - E-14
  - FP-1
  - FP-2
  - FP-3
  - FP-4

## **SECTION 270500**

### **COMMON WORK RESULTS FOR COMMUNICATIONS SYSTEMS**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY.**

- A. Provide and install a complete structured cabling, security and background music/overhead paging system support system. The support system shall include, but not be limited to, cabling pathways, grounding and bonding systems and appropriate mounting hardware and accessories. Build out of the telecommunications room and telecommunication enclosure shall be included in the scope of the project. The telecommunication equipment racks will be furnished and installed within the scope of this project. Installation shall include setting or mounting the equipment racks in place, completion of grounding and bonding systems to properly ground and bond all equipment, members and items within the equipment racks and to connect the pre-mounted power strips within the equipment racks to the electrical receptacles. Power strip cables and all ground and bonding conductors shall be properly dressed and supported within the equipment racks and to the appropriate cable pathways. All support systems shall be installed to meet the industry standards of the cabling and connectivity being supported in addition to local and national codes.

##### **1.3 REFERENCED STANDARDS AND CODES**

- A. NFPA 70 National Electric Code (NEC).
- B. Authority Having Jurisdiction.
- C. UL® for wiring: UL® Standard 910 "Test method for fire and smoke characteristics of cable used in air handling spaces." Provide products that are UL® listed and labeled for such use. UL® testing bulletin. Underwriters Laboratories (UL®) cable certification and follow up program.
- D. American National Standards Institute/Telecommunications Industry Association. ANSI/TIA, including associated Addenda:
  - 1. ANSI/TIA-568-C.0 – Generic Telecommunications Cabling for Customer Premises.
  - 2. ANSI/TIA-568-C.0-1 – Generic Telecommunications Cabling for Customer Premises – Addendum 1, Updated References for Balanced Twisted-Pair.
  - 3. ANSI/TIA-568-C.0-2 – Generic Telecommunications Cabling for Customer Premises – Addendum 2, General Updates.
  - 4. ANSI/TIA-568-C.1 – Commercial Building Telecommunications Cabling Standard.
  - 5. ANSI/TIA-568-C.1-1 – Commercial Building Telecommunications Cabling Standard – Addendum 1, Pathways and Spaces.
  - 6. ANSI/TIA-568-C.1-2 – Commercial Building Telecommunications Cabling Standard – Addendum 2, General Updates.

7. ANSI/TIA-568-C.2 –Balanced Twisted Pair Telecommunications Cabling and Components Standard.
8. ANSI/TIA-568-C.3 –Optical Fiber Cabling Components Standard.
9. ANSI/TIA-568-C.3-1 – Optical Fiber Cabling Components Standard – Addendum 1, Addition of OM4 Cabled Optical Fiber and Array Connectivity.
10. ANSI/TIA-569-C – Telecommunications Pathways and Spaces.
11. TIA-590-A – Standard for Physical Location and Protection of Below-Ground Fiber Optic Cable Plant.
12. ANSI/TIA-606-AB – Administration Standard for Commercial Telecommunications Infrastructure
13. ANSI/TIA-606-A-1 – Administration of Equipment Rooms and Data Center Computer Rooms.
14. ANSI/TIA-607-B – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
15. ANSI/TIA-607-B-1 – Generic Telecommunications Bonding and grounding (Earthing) for Customer Premises Addendum 1 – External Grounding.
16. ANSI/TIA-758-B – Customer Owned Outside Plant Telecommunications Infrastructure Standard.
17. ANSI/TIA-1005-A – Telecommunications Infrastructure Standard for Industrial Premises.
18. TIA TSB-155-A – Guidelines for the Assessment and Mitigation of Installed Category 6A Cabling to Support 10GBase-T.
19. TIA TSB-184 – Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling.
20. TIA-TSB-190 – Guidelines on Shared Pathways and Shared Sheaths.

- E. ANSI/NECA/BICSI 568-2006 – Installing Commercial Building Telecommunications Cabling.
- F. NECA/BICSI 607-2011 – Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings.
- G. National Electrical Manufacturers Association (NEMA).
- H. Institute of Electrical and Electronic Engineers (IEEE).
- I. American Society for Testing Materials (ASTM).

#### 1.4 RELATED SECTIONS

- A. 260526 – Grounding and Bonding for Electrical Systems.
- B. 20529 – Hangers and Supports for Electrical Systems.
- C. 270526 – Grounding and Bonding for Communications Systems.
- D. 270528 – Pathways for Communications Systems.
- E. 270544 – Sleeves and Sleeve Seals for Communications Systems

#### 1.5 DEFINITIONS / ACRONYMS / ABBREVIATIONS

- A. AHJ – Authority Having Jurisdiction.
- B. ANSI – American National Standards Institute.

- C. AWG – American Wire Gauge.
- D. CAT 6 A – Category 6A performance as defined by ANSI/TIA 568-C.2.
- E. EC – Electrical Contractor.
- F. EIA – Electronic Industries Alliance.
- G. ER – Equipment Room.
- H. EOR – Engineer of Record.
- I. GC – General Contractor.
- J. IEC – International Electrotechnical Commission.
- K. ISO – International Organization for Standardization.
- L. MM – Multimode (Fiber Optic Cable).
- M. NECA – National Electrical Contractors Association.
- N. NEMA – National Electrical Manufacturers Association.
- O. OM4 - Optical Multimode 4 “laser optimized” performance as defined by ISO/IEC 11801 Amd2 and ANSI/TIA-568-C.3-1.
- P. OS1 - Optical Single mode 1 performance as defined by ISO/IEC 11801 and ANSI/TIA-568 C.3.
- Q. OS2 - Optical Single mode 2 “low water peak” performance as defined by ISO/IEC 11801 Amd2 and ANSI/TIA-568-C.3.
- R. SCS – Structured Cabling System.
- S. SM – Single mode (Fiber Optic Cable).
- T. STP – Shielded Twisted Pair Cable.
- U. UTP – Unshielded Twisted Pair Cable.
- V. TBB – Telecommunications Bonding Backbone.
- W. TBBIBC – Telecommunications Bonding Backbone Interconnection Bonding Conductor.
- X. TC – Telecommunications Contractor.
- Y. TIA – Telecommunications Industry Association.
- Z. TGB – Telecommunications Ground Bus Bar.
- AA. TGB – Telecommunications Main Ground Bus Bar.
- BB. TO – Telecommunications Outlet.
- CC. TR – Telecommunications Room.



DD. UNO – Unless Noted Otherwise.

1.6 SUBMITTALS.

A. Product Data:

1. Submit the following in accordance with the general conditions and Division 01 and Division 20 specifications of contract. Submittals to include index with description, specification reference, manufacturer, part number, quantity and page number for manufacturer product specification sheet. Manufacturer's product specifications sheets shall indicate product part number. Where multiple products are indicated, products being submitted shall be clearly indicated on a single specification sheet. Products requiring submittals shall include but not be limited to the following.
  - a. All cable and wire including patch cables and cross-connect wire.
  - b. All connectors and required tools.
  - c. All termination system components for each cable type.
  - d. All equipment room and telecommunications room ~~equipment racks, cabinets, horizontal and vertical cable management, ladder tray, installation hardware and other support equipment.~~
  - e. All grounding system components.
  - f. All fire seal systems, including manufacturer published installation requirements
  - g. All cable raceways and support hardware

B. Samples.

1. Contractor shall provide samples to the Architect EOR for review and approval. Samples shall be provided for the following:
  - a. Each configuration of work are.
  - b. Termination hardware labeling.
  - c. Backbone labeling scheme.
  - d. Horizontal cabling labeling scheme.

C. Test Plans:

1. Contractor shall provide detailed test plans and test documentation as specified for each sub-system.

D. Shop Drawings:

1. Electrical Contractor shall produce, provide and coordinate shop drawings for all conduits, ~~cable trays and~~ other equipment. All shop drawings are to be coordinated with other trades, architect and EOR.
2. Telecommunications Contractor shall produce, provide and coordinate shop drawings for all ~~ladder racks, equipment cabinets, equipment racks and~~ other equipment. All shop drawings shall be coordinated with other trades, architect and the EOR.
3. All shop drawings are to be produced using AutoCAD version 2004 or later.
4. Cross-connection schedule is to be produced in a matrix / schedule format using the latest version of Microsoft Excel. Include soft copy and hard copies.

E. As-Built Documentation.

1. Contractor shall provide complete as-built documentation. As-built documentation shall include AutoCAD drawings indicating all conduits, ~~cable trays, ladder racks, equipment cabinets, equipment racks~~ and other equipment. All TOs are to be indicated on as-built drawings including TO numbers. Cable paths for all backbone cables are to be indicated on as-built drawings.
2. Contractor shall provide complete as-built documentation. As-built documentation shall include AutoCAD drawings indicating all conduits, cable trays and other equipment.
3. Contractor shall provide 3 hard copies and 1 soft copy on CD.
4. As-built drawings are to be produced using AutoCAD version 2004 or later. The following criteria are to be used:
  - a. Floor/conduit/zone plans are to be produced at a scale of 1/8"=1'0".
  - b. TR and ER partial plans are to be produced at a scale of 1/4" = 1' 0" or 1/2" = 1' 0" as appropriate to the complexity and size of the room in being depicted.
  - c. Alignment targets (targets) are to be included in each file that references a building floor plan.
    - 1) The targets are to present a cross-hair registered to building column line intersections and labeled with the column intersection thus referenced.
    - 2) The targets shall be AutoCAD blocks with the origin at the intersection of the cross-hairs and attributes for the column information.
    - 3) The alignment targets are to reside on a separate layer created for this use.
    - 4) A minimum of two (2) such alignment targets are required for each contiguous area referenced, e.g. if two floors are shown in the same drawing, two alignment targets are required per floor
  - d. Drawing files shall be prepared using English Architectural units
  - e. No custom line-styles are to be used in the preparation of the drawing files.
5. Provide a cross connect schedule for all backbone cables installed. Schedules shall indicate all pairs of the backbone cables and all installed cross connections. Schedules are to be created in latest version Microsoft Excel or another approved format. Include soft copy and hard copies.

F. Test Equipment.

1. TC shall submit manufacturer data sheets for all test equipment to be utilized in the certification of the structured cabling system.
2. The TC shall submit current calibration certificates to EOR for all equipment to be utilized in the testing of the structured cabling system. All calibration certificates are to be issued by the test equipment manufacturer. Certificates are to be received by EOR no less than seven days prior to beginning any testing.

G. Test Data.

1. The contractor shall provide test data as specified for each sub-system.

H. Warranty.

1. Contractor shall provide an extended 5-year warranty covering all work, including but not limited to: equipment, devices and labor.

## 1.7 CONTRACTOR QUALIFICATIONS

- A. The TC selected for this project shall be certified by the manufacturer(s) of the products specified in this scope of work, adhere to the design engineering, installation and testing procedures and utilize the authorized manufacturer(s) components in completing this project.
- B. The TC shall be experienced in all aspects of the work required to complete this project and shall be required to demonstrate direct experience on recently installed systems of similar size and type.
- C. The TC shall own and maintain equipment and tools required for the installation and testing of Category 6A copper and optical fiber structured cabling systems. The TC shall also employ personnel who are adequately trained in the uses of required tools and equipment.
- D. TC shall submit letters of certification from the proposed system manufacture indicating the TC is an approved installer of proposed system and has had personnel trained in the proper installation and testing procedures of said system.

## 1.8 SCOPE OF WORK

- A. Telecommunications Scope of Work.
  - 1. The Electrical Contractor shall carefully examine the contract documents and thoroughly become familiar with the building standards and local conditions relating to the work. Failure to do so will not relieve the contractor of the obligations of the contract.
  - 2. Provide UL® listed fireseal systems for all telecommunications cabling pathways using caulk putty, pillows or similar devices per manufacturer's instructions to maintain existing and new fire ratings. Verify rating conditions and locations prior to final bids. All open sleeves, slots or other penetrations shall be fire sealed inside after all cabling is completely installed. Fireseal methods shall be submitted by contractor and shall be subject to the approval of the owner. Contractor shall provide caps and fireseal to maintain the original cores that are not to be used and/or reused. Contractor shall verify exact quantities in the field prior to submission of bids.
  - 3. Properly ground to telecommunications equipment, including but not limited to racks, cabinets, ladder tray, riser cables, etc. in accordance with manufacturer recommendations and ANSI/TIA-607-B, NFPA 70, all applicable building codes and specification section 27 05 26.
  - 4. **The Electrical Contractor shall install all CAT 6 wiring, patch panels and wall jacks with cover plate for data wiring shown on the drawings.**
  - 5. **The Electrical Contractor shall install all RG6 wiring and wiring terminations.**
  - 6. **The Electrical Contractor shall install all HDMI and Active Optical Fiber HDMI cables.**
  - 7. **The Electrical Contractor shall test all terminations.**

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

## END OF SECTION 270500

## **SECTION 271513**

### **COMMUNICATIONS COPPER HORIZONTAL CABLING**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Category 6 twisted pair cable.
  - 2. Cable management system.
  - 3. Cabling identification products.
  - 4. Grounding provisions for twisted pair cable.
  - 5. Source quality control requirements for twisted pair cable.

##### **1.3 DEFINITIONS**

- A. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- B. EMI: Electromagnetic interference.
- C. FTP: Shielded twisted pair.
- D. F/FTP: Overall foil screened cable with foil screened twisted pair.
- E. F/UTP: Overall foil screened cable with unscreened twisted pair.
- F. IDC: Insulation displacement connector.
- G. LAN: Local area network.
- H. Jack: Also commonly called an "outlet," it is the fixed, female connector.
- I. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.
- J. RCDD: Registered Communications Distribution Designer.
- K. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.
- L. Shield: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

- M. S/FTP: Overall braid screened cable with foil screened twisted pair.
- N. S/UTP: Overall braid screened cable with unscreened twisted pairs.
- O. UTP: Unscreened (unshielded) twisted pair.

#### 1.4 COPPER HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1," in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.
  - 1. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.
  - 2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
  - 3. Bridged taps and splices shall not be installed in the horizontal cabling.
- B. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the equipment outlets to the station equipment.
- C. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Reviewed and stamped by RCDD.
  - 1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
  - 2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
  - 3. Cabling administration Drawings and printouts.
  - 4. Wiring diagrams and installation details of telecommunications equipment, to show location and layout of telecommunications equipment, including the following:
    - a. Telecommunications rooms plans and elevations.
    - b. Telecommunications pathways.
    - c. Telecommunications system access points.
    - d. Telecommunications grounding system.
    - e. Telecommunications conductor drop locations.
    - f. Typical telecommunications details.
    - g. Mechanical, electrical, and plumbing systems.
- C. Twisted pair cable testing plan.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For RCDD, installation supervisor, and field inspector.
- B. Product Certificates: For each type of product.
- C. Source quality-control reports.
- D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For splices and connectors to include in maintenance manuals.
- B. Software and Firmware Operational Documentation:
  - 1. Software operating and upgrade manuals.
  - 2. Program Software Backup: On USB media or compact disk, complete with data files.
  - 3. Device address list.
  - 4. Printout of software application and graphic screens.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Connecting Blocks: One of each type.
  - 2. Faceplates: Four of each type.
  - 3. Jacks: Ten of each type.
  - 4. Multiuser Telecommunications Outlet Assemblies: One of each type.
  - 5. Patch-Panel Units: One of each type.
  - 6. Plugs: Ten of each type.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
  - 1. Layout Responsibility: Preparation of Shop Drawings and field testing program development by an RCDD.
  - 2. Installation Supervision: Installation shall be under the direct supervision of Technician, who shall be present at all times when Work of this Section is performed at Project site.
- B. Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.
  - 1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
  - 1. Test each pair of twisted pair cable for open and short circuits.

1.11 PROJECT CONDITIONS

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

1.12 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

**PART 2 - PRODUCTS**

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
- B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
  - 1. Communications, Plenum Rated: Type CMP complying with UL 1685[ or Type CMP in listed cable routing assembly.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 50 or less.
- C. RoHS compliant.

2.3 CATEGORY 6 TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Belden.
  - 2. Commscope.
  - 3. Leviton

- C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- D. Conductors: 100-ohm, 23 AWG solid copper.
- E. Shielding/Screening: Unshielded twisted pairs (UTP).
- F. Cable Rating: Plenum.
- G. Jacket: Blue thermoplastic.

## 2.4 TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. ICC.
  - 2. Belden
  - 3. Leviton
- C. General Requirements for Twisted Pair Cable Hardware:
  - 1. Comply with the performance requirements of Category 6.
  - 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
  - 3. Cables shall be terminated with connecting hardware of same category or higher.
- D. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.
- E. Connecting Blocks:
  - 1. 110-style IDC for Category 6.
  - 2. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.
- F. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
  - 1. Features:
    - a. Universal T568A and T568B wiring labels.
    - b. Labeling areas adjacent to conductors.
    - c. Replaceable connectors.
    - d. 24 or 48 ports.
  - 2. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
  - 3. Number of Jacks per Field: One for each four-pair conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria.
- G. Plugs and Plug Assemblies:



1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Standard: Comply with TIA-568-C.2.
3. Marked to indicate transmission performance.

H. Jacks and Jack Assemblies:

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Designed to snap-in to a patch panel or faceplate.
3. Standard: Comply with TIA-568-C.2.
4. Marked to indicate transmission performance.

I. Faceplate:

1. Two, four, or six port, vertical single gang faceplates designed to mount to single gang wall boxes.
2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
3. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
  - a. Flush mounting jacks, positioning the cord at a 45-degree angle.

J. Legend:

1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

## 2.5 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

## 2.6 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
- B. Comply with TIA-607-B.

## 2.7 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test cables on reels according to TIA-568-C.1.
- C. Factory test twisted pair cables according to TIA-568-C.2.
- D. Cable will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

## **PART 3 - EXECUTION**

### **3.1 WIRING METHODS**

- A. Wiring Method: Install cables in raceways, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, attics, and gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables, except in unfinished spaces.
  - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
  - 2. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."
- B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

### **3.2 INSTALLATION OF PATHWAYS**

- A. Comply with requirements for demarcation point, cabinets, and racks specified in Section 271100 "Communications Equipment Room Fittings."
- B. Comply with Section 270528 "Pathways for Communications Systems."
- C. Comply with Section 270529 "Hangers and Supports for Communications Systems."
- D. Comply with Section 270536 "Cable Trays for Communications Systems."
- E. Drawings indicate general arrangement of pathways and fittings.

### **3.3 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES**

- A. Comply with NECA 1 and NECA/BICSI 568.
- B. General Requirements for Cabling:
  - 1. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
  - 2. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
  - 3. Install 110-style IDC termination hardware unless otherwise indicated.
  - 4. Do not untwist twisted pair cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
  - 5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
  - 6. MUTOA shall not be used as a cross-connect point.
  - 7. Consolidation points may be used only for making a direct connection to equipment outlets:
    - a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.

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4. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

### 3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with "Firestopping Systems" Article in BICSI's "Telecommunications Distribution Methods Manual."

### 3.5 GROUNDING

- A. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."
- B. Comply with TIA-607-B and NECA/BICSI-607.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

### 3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
  1. Administration Class: Class 1.
  2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.
- B. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

- C. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
- D. Cable and Wire Identification:
  - 1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
  - 2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
  - 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
  - 4. Label each terminal strip, and screw terminal in each cabinet, rack, or panel.
    - a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group, extended from a panel or cabinet to a building-mounted device, with the name and number of a particular device.
    - b. Label each unit and field within distribution racks and frames.
  - 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and -connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- E. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:
  - 1. Cables use flexible vinyl or polyester that flexes as cables are bent.

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
  - 1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
  - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
  - 3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
    - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

- C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.
- D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

**END OF SECTION 271513**

## **SECTION 271533**

### **COMMUNICATIONS COAXIAL HORIZONTAL CABLING**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. Section Includes:
  - 1. CATV coaxial cable.
  - 2. Coaxial cable hardware.
  - 3. Grounding.
  - 4. Identification products.

##### **1.3 DEFINITIONS**

- A. BICSI: Building Industry Consulting Service International.
- B. EMI: Electromagnetic interference.
- C. IDC: Insulation displacement connector.
- D. LAN: Local area network.
- E. RCDD: Registered Communications Distribution Designer.

##### **1.4 COAXIAL HORIZONTAL CABLING DESCRIPTION**

- A. Coaxial horizontal cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C and the equipment outlet, otherwise known as "Cabling Subsystem 1" in the telecommunications cabling system structure. Cabling system consists of horizontal cables, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.

##### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Nominal OD.
  - 2. Minimum bending radius.
  - 3. Maximum pulling tension.

B. Shop Drawings:

1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
3. Cabling administration drawings and printouts.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For RCDD, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.
- D. Maintenance Data: For splices and connectors to include in maintenance manuals.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For coaxial cable, splices, and connectors to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Connecting Blocks: One of each type.
  2. Jacks: Ten of each type.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
  1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings[, Cabling Administration Drawings, and field testing program development by an RCDD.
  2. Installation Supervision: Installation shall be under the direct supervision of Technician, who shall be present at all times when Work of this Section is performed at Project site.
- B. Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.
  1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
  1. Test each coaxial cable [**on the reel**] for continuity.



#### 1.11 PROJECT CONDITIONS

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

#### 1.12 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard, and the requirements of TIA-568-C.4.
- B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- C. Grounding: Comply with TIA-607-B.

#### 2.2 GENERAL CABLE CHARACTERISTICS

- A. CATV Cable: Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
  - 1. CATV Cable: Type CATV installed in general purpose, riser, or plenum communications raceways or cable routing assemblies in fireproof riser shafts with firestops at each penetration.

#### 2.3 CATV COAXIAL CABLE

- A. Description: Coaxial cable with a 75-ohm characteristic impedance designed for CATV transmission.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Belden.
  - 2. Commscope.
  - 3. Leviton
  - 4. RG-6/U: UL Type CATVP.
    - a. No. 18 AWG, solid, copper-covered steel conductor.
    - b. Plenum rated.
    - c. Gas-injected, foam-PE insulation.

- d. Shielded with 100 percent aluminum tape and 40 percent aluminum braid.
- e. Jacketed with black PVC or PE.
- f. Suitable for indoor installations.

## 2.4 COAXIAL CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate coaxial cable with a 75-ohm characteristic impedance.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Belden.
  - 2. Hubbel
  - 3. Leviton
- C. Coaxial-Cable Connectors: Type BNC, 75 ohms.
- D. Jacks and Jack Assemblies: Modular, color-coded, with female Type BNC connectors.
- E. Faceplates:
  - 1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
  - 2. For use with snap-in jacks accommodating any combination of twisted pair, optical-fiber, and coaxial work area cords.
    - a. Flush-mounted jacks, positioning the cord at a 90-degree angle from faceplate surface.
  - 3. Legend:
    - a. Machine printed, in the field, using adhesive-tape label.
    - b. Snap-in, clear-label covers and machine-printed paper inserts.

## 2.5 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
- B. Comply with TIA-607-B.

## 2.6 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

## 2.7 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.

- B. Cable will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

## **PART 3 - EXECUTION**

### **3.1 ENTRANCE FACILITIES**

- A. Coordinate horizontal cabling with the protectors and demarcation point provided by communications service provider.

### **3.2 WIRING METHODS**

- A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
  - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
  - 2. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."
- B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

### **3.3 INSTALLATION OF PATHWAYS**

- A. Comply with Section 271100 "Communications Equipment Room Fittings." Comply with requirements in Section 270528 "Pathways for Communications Systems" for installation of conduits and wireways.
- B. Comply with Section 270528.29 "Hangers and Supports for Communications Systems."
- C. Drawings indicate general arrangement of pathways and fittings.
- D. Comply with NFPA 70 for pull-box sizing and length of conduit and number of bends between pull points.
- E. Install manufactured conduit sweeps and long-radius elbows whenever possible.
- F. Pathway Installation in Communications Equipment Rooms:
  - 1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
  - 2. Install cable trays to route cables if conduits cannot be located in these positions.
  - 3. Secure conduits to backboard when entering room from overhead.
  - 4. Extend conduits 3 inches (76 mm) above finished floor.
  - 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

- G. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

### 3.4 INSTALLATION OF COAXIAL HORIZONTAL CABLES

- A. Comply with NECA 1 and NECA/BICSI 568.
- B. General Requirements for Cabling:
  - 1. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
  - 2. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and patch panels.
  - 3. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  - 4. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
  - 5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
  - 6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
  - 7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
  - 8. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
  - 9. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems," "Pulling Cable" Section. Monitor cable pull tensions.
- C. Open-Cable Installation:
  - 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
  - 2. Suspend coaxial cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
  - 3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- D. Group connecting hardware for cables into separate logical fields.
- E. Separation from EMI Sources:
  - 1. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
    - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    - b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).

2. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
  - b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 6 inches (150 mm).
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
3. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment Rating Between 2 and 5 kVA: A minimum of 3 inches (76 mm).
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
4. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
5. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

### 3.5 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

### 3.6 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with TIA-607-B and NECA/BICSI-607.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

### 3.7 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
  1. Administration Class: Class 1.

2. Color-code fields and apply colors to voice and data service backboards, connections, covers, and labels.
- B. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- C. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, horizontal pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
- D. Cable and Wire Identification:
  1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
  2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
  3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
  4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
    - a. Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device with name and number of particular device as shown.
    - b. Label each unit and field within distribution racks and frames.
  5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communications cabling, use a different color for jacks and plugs of each service.
- E. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606-B, for the following:
  1. Cables use flexible vinyl or polyester that flexes as cables are bent.


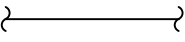


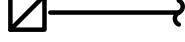
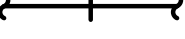

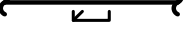





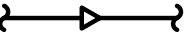





### 3.8 FIELD QUALITY CONTROL








- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
  1. Visually inspect coaxial jacket materials for NRTL certification markings.
  2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
  3. Test coaxial horizontal copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination.

- C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
- D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

**END OF SECTION 271533**



DUCTWORK AND ACCESSORIES	
	WORK BY THIS CONTRACTOR
	EXISTING WORK OR WORK DONE BY OTHERS
	DUCT SMOKE DETECTOR
	SUPPLY DUCTWORK
	EXHAUST OR RETURN DUCTWORK
	BALANCING DAMPER (BD)
	DIFFUSER
	GRILLE OR REGISTER
	SLOT DIFFUSER
	SLOT REGISTER
	ELBOW DOWN
	DUCT TURNING UP
	TRANSITION - RECTANGULAR TO RECTANGULAR
	TRANSITION - RECTANGULAR TO ROUND
	FLEXIBLE DUCTWORK
	AUTOMATIC AIR DAMPER (AAD)
	LOUVER OR BACKDRAFT DAMPER
	FIRE DAMPER (FD)
	VAV

GENERAL	
	THERMOSTAT
	SENSOR
	HUMIDISTAT
	REFER TO INDICATED NEW WORK NOTE
	CONNECT NEW TO EXISTING
	REFER TO INDICATED DEMOLITION NOTE
	EXTENT OF DEMOLITION

ABBREVIATIONS	
ABV	ABOVE
ACC/CU	AIR COOLED CHILLER/AIR COOLED CONDENSING UNIT
AFT	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
AHU	AIR HANDLING UNIT
BD	BALANCING DAMPER
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
CC	COOLING COIL
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CU	CONDENSING UNIT
D	DIFFUSER
DB	DRY BULB
DC	DUCT COIL
DN	DOWN
EAT	ENTERING AIR TEMPERATURE
EBBR	ELECTRIC BASEBOARD RADIATION
EC	ELECTRICAL CONTRACTOR
EDC	ELECTRIC DUCT COIL
EER	ENERGY EFFICIENCY RATIO
EFF	EFFICIENCY
ESP	EXTERNAL STATIC PRESSURE
EXG	EXISTING
DHW	ELECTRIC WALL HEATER
ENT	ENTERING WATER TEMPERATURE
F	FAN
FLA	FULL LOAD AMPS
FT	FOOT (FEET)
FPW	FOOT (FEET) PER MINUTE
G	GRILLE
GF	GAS FURNACE
H	HEAD
HP	SPLIT SYSTEM HEAT PUMP
HP	HORSEPOWER
IH	INFRARED HEATER
KW	KILOWATT
L	LINEAR FEET
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CURRENT AMPACITY
MIN	MINIMUM
MOC	MAXIMUM OVERCURRENT PROTECTION DEVICE
O.A.	OUTDOOR AIR
O.A.I	OUTDOOR AIR INTAKE
OED	OPEN END DUCT
PC	PLUMBING CONTRACTOR
PL	PLACES
PSI	POUND PER SQUARE INCH
PSIG	POUND PER SQUARE INCH GAUGE
R	REGISTER
RL	REFRIGERANT LIQUID PIPING
RLA	RATED LOAD AMPS
RPW	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION PIPING
RTU	ROOFTOP AIR CONDITIONING UNIT
SD	SUPPLY DIFFUSER
SR	SUPPLY REGISTER
TEMP	TEMPERATURE
THP	THRU-WALL HEAT PUMP
TYP	TYPICAL
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME DAMPER
VTR	VENT THRU ROOF
W/	WITH
WH	WALL HEATER

### MECHANICAL GENERAL NOTES:

- ALL MECHANICAL WORK SHALL BE DONE IN ACCORDANCE WITH ALL STATE AND LOCAL LAWS AND ORDINANCES AND IN A MANNER SATISFACTORY TO THE OWNER AND AUTHORITY HAVING JURISDICTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL REQUIRED PERMITS, INSPECTIONS AND PAY ALL APPLICABLE FEES. COMPLY WITH LATEST APPLICABLE EDITIONS OF THE INTERNATIONAL BUILDING CODE, INTERNATIONAL MECHANICAL CODE, INTERNATIONAL PLUMBING CODE, AND INTERNATIONAL ENERGY CONSERVATION CODE.
- DUCTWORK, PIPING AND EQUIPMENT LAYOUTS ARE SCHEMATIC. DO NOT SCALE THE DRAWINGS. ALL DROPS, RISES, OR OFFSETS REQUIRED BUT NOT SHOWN SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER TRADES. CONTRACTOR GENERATED COORDINATION DRAWINGS ARE REQUIRED AND SHOULD INDICATE STRUCTURE, CEILING FEATURES, LIGHT FIXTURES, PLUMBING AND FIRE SERVICE PIPING AND ALL MECHANICAL EQUIPMENT, PIPING AND DUCTWORK.
- ALL MATERIALS NOT REUSED OR CLAIMED BY THE OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE REMOVED PROMPTLY FROM THE PREMISES BY THE CONTRACTOR.
- CONTRACTOR SHALL LOCATE ALL NEW PIPING AND DUCTWORK AS HIGH AS POSSIBLE (UNLESS NOTED OTHERWISE), COORDINATE ALL WORK WITH EXISTING CONDITIONS, OTHER TRADES, AND CONFORM WITH ALL LOCAL CODES.
- ALL HVAC EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS WRITTEN INSTALLATION GUIDE.
- ALL DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL (UNLESS SPECIFIED OTHERWISE) AND BE FABRICATED ACCORDING TO THE LATEST EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR METAL AND FLEXIBLE DUCTWORK. ALL DUCTWORK SHALL BE SEALED WITH HARD CAST IN ACCORDANCE WITH SMACNA SEAL CLASS B.
- DO NOT LOCATE VALVES, DAMPERS, ACTUATORS, CONTROL COMPONENTS, ANY EQUIPMENT WITH MOVING PARTS OR ANY EQUIPMENT NEEDING ACCESS OR REGULAR MAINTENANCE ABOVE INACCESSIBLE CEILINGS. PROVIDE AN ACCESS PANEL THAT WILL ALLOW SAFE AND PRACTICAL ACCESS. COORDINATE ACCESS PANEL LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
- DUCT CONNECTIONS TO ALL AIR HANDLING UNITS, INCLUDING FAN COIL UNITS, ETC. SHALL BE MADE USING FLEXIBLE DUCT CONNECTION. ALSO, PROVIDE FLEXIBLE DUCT CONNECTIONS WHERE DUCTWORK CROSSES BUILDING EXPANSION JOINTS.
- DUCT DIMENSIONS INDICATED ARE CLEAR INSIDE DIMENSIONS. WHERE ACOUSTIC LINING IS SPECIFIED, THE DUCT SIZES SHALL BE INCREASED AS REQUIRED TO COMPENSATE FOR THE LINING.
- LOCATE CEILING AIR DIFFUSERS, REGISTERS AND GRILLES IN THE CENTER OF 2'x2' AND AT THE QUARTER POINT OF 2'x4' ACOUSTICAL TILE CEILING MODULES UNLESS SPECIFICALLY INDICATED OTHERWISE ON THE ARCHITECTURAL REFLECTED CEILING PLANS.
- ALL THERMOSTATS, SENSORS OR OTHER CONTROL DEVICES SHALL BE INSTALLED AT 48" MAXIMUM IN ACCORDANCE WITH ADA REQUIREMENTS. COORDINATE LOCATIONS WITH CABINETRY, ELECTRICAL SWITCHES, ETC. DO NOT MOUNT THEM ABOVE ELECTRICAL DEVICES. PROVIDE AN INSULATED SUB-BASE FOR ANY DEVICES MOUNTED ON A WALL ADJOINING TO AN UNCONDITIONED SPACE.
- TESTING OF HVAC UNITS, AIR DISTRIBUTION DUCTWORK AND AIR OUTLETS SHALL BE PERFORMED TO VERIFY THAT THE FAN, HEAT AND COOL STAGES CYCLE ON AND OFF. PROVIDE AIR BALANCE TESTING IN ACCORDANCE WITH THE SPECIFICATIONS FOR ALL NEW SYSTEMS TO DOCUMENT AIR FLOW QUANTITIES AND SUBMIT REPORTS ON NEW SYSTEMS.
- SEE ARCHITECTURAL FIRE PROTECTION DRAWINGS FOR DETAILS OF FIRE AND SMOKE SEALING REQUIREMENTS AT PENETRATIONS OF ALL UL LISTED FIRE AND SMOKE RATED WALL, FLOOR AND ROOF/CEILING ASSEMBLIES.
- CONTRACTOR SHALL NOT INSTALL DUCTWORK, EQUIPMENT, ETC. ABOVE ANY ELECTRICAL PANEL. CONTRACTOR SHALL COORDINATE DEDICATED ELECTRICAL SPACE WITH ELECTRICAL CONTRACTOR.

### NEW WORK NOTES:

- INSTALL HEAT PUMP ON 12" HIGH EQUIPMENT RAILS (PATE MODEL 'ES, OR EQUAL). INSTALL IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. MAINTAIN ALL REQUIRED CLEARANCES FOR SERVICE AND OPERATION. SIZE AND ROUTE REFRIGERANT PIPING BETWEEN INDOOR AND OUTDOOR UNITS IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. ALL PIPING AND WIRING SHALL BE ROUTED INTO BUILDING THROUGH PIPE CURB ASSEMBLY (PATE MODEL 'PCA', OR EQUAL). MAINTAIN A MINIMUM OF 10" FROM EQUIPMENT TO ROOF EDGE OR PROVIDE FALL PROTECTION IN ACCORDANCE WITH CODE REQUIREMENTS.
- INSTALL PACKAGED ROOFTOP UNIT IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. MAINTAIN ALL REQUIRED CLEARANCES FOR SERVICE AND OPERATION. MAINTAIN A MINIMUM OF 10" BETWEEN OA INTAKE AND ALL EXHAUST/VENT OUTLETS. COORDINATE FLASHING OF ROOF CURB WITH GENERAL CONTRACTOR OR BUILDING OWNER. PROVIDE TRAPPED SCHEDULE 40 PVC DRAIN OUTLET WITH SPLASH BLOCK. DUCTWORK SHALL BE EXTENDED THROUGH CURB FULL SIZE OF UNIT INLET/OUTLET.
- INSTALL AIR HANDLER ON STEEL SUPPORT STAND. INSTALL IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. MAINTAIN ALL REQUIRED CLEARANCES FOR SERVICE AND OPERATION. ROUTE CONDENSATE TO GRADE OR NEAREST MOP BASIN. PROVIDE CONDENSATE PUMP AS REQUIRED.
- INSTALL AIR HANDLER IN HORIZONTAL POSITION ABOVE CEILING OR IN ATTIC SPACE. INSTALL IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. MAINTAIN ALL REQUIRED CLEARANCES FOR SERVICE AND OPERATION. PROVIDE DRAIN PAN WITH WATER DETECTION SWITCH UNDER ENTIRE UNIT. ROUTE CONDENSATE TO GRADE OR NEAREST MOP BASIN. PROVIDE CONDENSATE PUMP AS REQUIRED.
- INSTALL BRANCH CONTROLLER IN HORIZONTAL POSITION ABOVE CEILING. INSTALL IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. MAINTAIN ALL REQUIRED CLEARANCES FOR SERVICE AND OPERATION. PROVIDE DRAIN PAN WITH WATER DETECTION SWITCH UNDER ENTIRE UNIT. ROUTE CONDENSATE TO NEAREST MOP BASIN. PROVIDE CONDENSATE PUMP AS REQUIRED.
- INSTALL WALL-MOUNTED SPLIT SYSTEM AIR HANDLER. ROUTE AND SIZE REFRIGERANT PIPING IN ACCORDANCE WITH ALL MANUFACTURER REQUIREMENTS. ROUTE CONDENSATE TO GRADE OR NEAREST MOP BASIN. PROVIDE CONDENSATE PUMP AS REQUIRED.
- INSTALL CEILING-MOUNTED SPLIT SYSTEM AIR HANDLER. ROUTE AND SIZE REFRIGERANT PIPING IN ACCORDANCE WITH ALL MANUFACTURER REQUIREMENTS. ROUTE CONDENSATE TO GRADE OR NEAREST MOP BASIN. PROVIDE CONDENSATE PUMP AS REQUIRED.
- DUCT PENETRATIONS INTO BUILDING SHALL BE SEALED WATER TIGHT.
- ROUTE 6" EA DUCT TO WALL EXHAUST CAP. EXHAUST WALL CAP SHALL BE BROAN MODEL 641. PAINT WALL CAP MATCH ADJACENT FINISHES. MAINTAIN A MINIMUM OF 10" FROM ALL ADJACENT OA INTAKES AND 3' TO ALL ADJACENT OPERABLE BUILDING OPENINGS.
- INSTALL GAS UNIT HEATER IN ACCORDANCE WITH ALL MANUFACTURERS REQUIREMENTS. ROUTE FLUE AND COMBUSTION PIPING TO EXTERIOR OF BUILDING AND TERMINATE WITH MANUFACTURERS CONCENTRIC VENT KIT. FLUE AND COMBUSTION PIPING SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS BASED ON ACTUAL DEVELOPED LENGTH.
- ROUTE CONDENSATE TO GRADE WITH ELBOW TURNING DOWN 6" ABOVE GRADE.
- ROUTE CONDENSATE TO MOP BASIN WITH ELBOW TURNING DOWN 6" ABOVE RIM OF BASIN.

### GENERAL DEMOLITION NOTES:

- WHERE IT IS INDICATED THAT DUCTWORK OR PIPING IS TO BE REMOVED IN ITS ENTIRETY, THIS SHALL MEAN THAT THE DUCTWORK, PIPING, INSULATION, HANGERS, CONNECTORS, ACCESSORIES, CONTROLS, ETC. SHALL BE REMOVED FROM THE POINT OF ORIGIN TO THE TERMINATION POINT. PIPING EMBEDDED IN WALLS OR FLOORS NOT BEING DEMOLISHED MAY BE ABANDONED IN PLACE AS LONG AS THE ENDS ARE SATISFACTORILY CLOSED, WILL NOT IMPEDE NEW CONSTRUCTION AND IS REMOVED TO THE ACCESSIBLE LOCATION.
- EQUIPMENT, DUCTWORK, PIPING AND/OR ACCESSORIES INDICATED TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY EVEN IF A PORTION OF THE SYSTEM IS OUTSIDE THE DEFINED AREA OF DEMOLITION.
- SYSTEMS WHICH ORIGINATE IN OR PASS THROUGH THE AREA OF DEMOLITION BUT WHICH SERVE AREAS OUTSIDE OF THE AREA OF DEMOLITION SHALL BE RETAINED UNLESS NOTED OTHERWISE. SYSTEMS OR PORTIONS THEREOF WHICH CONNECT TO EQUIPMENT IN THE AREA OF DEMOLITION WHICH IS TO REMAIN SHALL BE RETAINED, UNLESS OTHERWISE NOTED. PORTIONS OF SYSTEMS WHICH CONFLICT WITH CLEARANCES FOR NEW CONSTRUCTION SHALL BE REMOVED AND RELOCATED TO MAINTAIN THE FUNCTIONALITY OF THE SYSTEM.
- DRAWING DEMOLITION NOTES LISTED UNDER THE DEMOLITION AREA IDENTIFICATION SHALL APPLY TO ALL ROOMS/AREAS WITHIN THE AREA OF DEMOLITION. OTHER INDIVIDUAL DRAWING DEMOLITION NOTES ARE IN ADDITION TO THOSE UNDER THE AREA IDENTIFICATION AND APPLY ONLY TO ITEMS IDENTIFIED.
- ANY ABANDONED DUCTWORK, PIPING, EQUIPMENT AND ACCESSORIES IN THE AREA OF DEMOLITION, WHETHER IDENTIFIED OR NOT, SHALL BE REMOVED IN THEIR ENTIRETY.
- DURING DEMOLITION WORK ALL MECHANICAL SYSTEMS OR BUILDING SERVICES SERVING OCCUPIED AREAS SHALL BE MAINTAINED OPERATIONAL. WHERE SYSTEM OR SERVICE INTERRUPTIONS ARE REQUIRED, COORDINATE WORKING REQUIREMENTS WITH OWNERS REPRESENTATIVE.
- OWNER EQUIPMENT SHALL BE RETURNED TO OWNER, UNLESS OTHERWISE DIRECTED.
- DEMOLISHED MATERIAL SHALL BE REMOVED AND DISPOSED OF IN COMPLIANCE WITH SPECIFICATIONS AND FEDERAL, STATE AND LOCAL CODES.
- NOT ALL SYSTEMS OR PORTIONS THEREOF ARE SHOWN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VISIT THE SITE TO DETERMINE THE FULL EXTENT OF DEMOLITION REQUIRED TO COMPLETE BOTH THE DEMOLITION AND NEW WORK.

### DEMOLITION NOTES:

- DISCONNECT AND REMOVE ALL MECHANICAL SYSTEMS IN THEIR ENTIRETY. PATCH AND INSULATE ALL WALL AND ROOF PENETRATIONS TO MATCH EXISTING CONSTRUCTION.

MG

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1268 PENN AVE  
WYOMISSING, PA 19610  
610.376.4927  
www.MG-Architects.com

PROJECT #:  
**23-0047.0**

CONSULTANT

MEI

MARTARANO  
ENGINEERING INC

1105 Berkshire Blvd. Suite 140  
Wyomissing, PA 19610  
(610) 376-9779  
Project #23-150

PROJECT # 23-150  
PROFESSIONAL SEAL

ANGELO L. MARTARANO  
MATTHEW PAGE

LOWER POTTS GROVE TWP

contact: CHRISTOPHER CAGGIANO  
2199 BLUCHTOWN ROAD  
POTTS TOWN, PA 19646  
610-310-1759  
ccaggiano1@gmail.com

LOWER POTTS GROVE TWP

LOWER POTTS GROVE MUNICIPAL  
BLDG & POLICE STATION

1963 E HIGH ST.  
POTTS TOWN, PA 19644

CONSTRUCTION DOCUMENTS	
REVISION HISTORY	
ID	DESCRIPTION
001	ISSUED FOR BID/PERMIT
002	ADDENDUM 1 REVISIONS
003	
004	
005	
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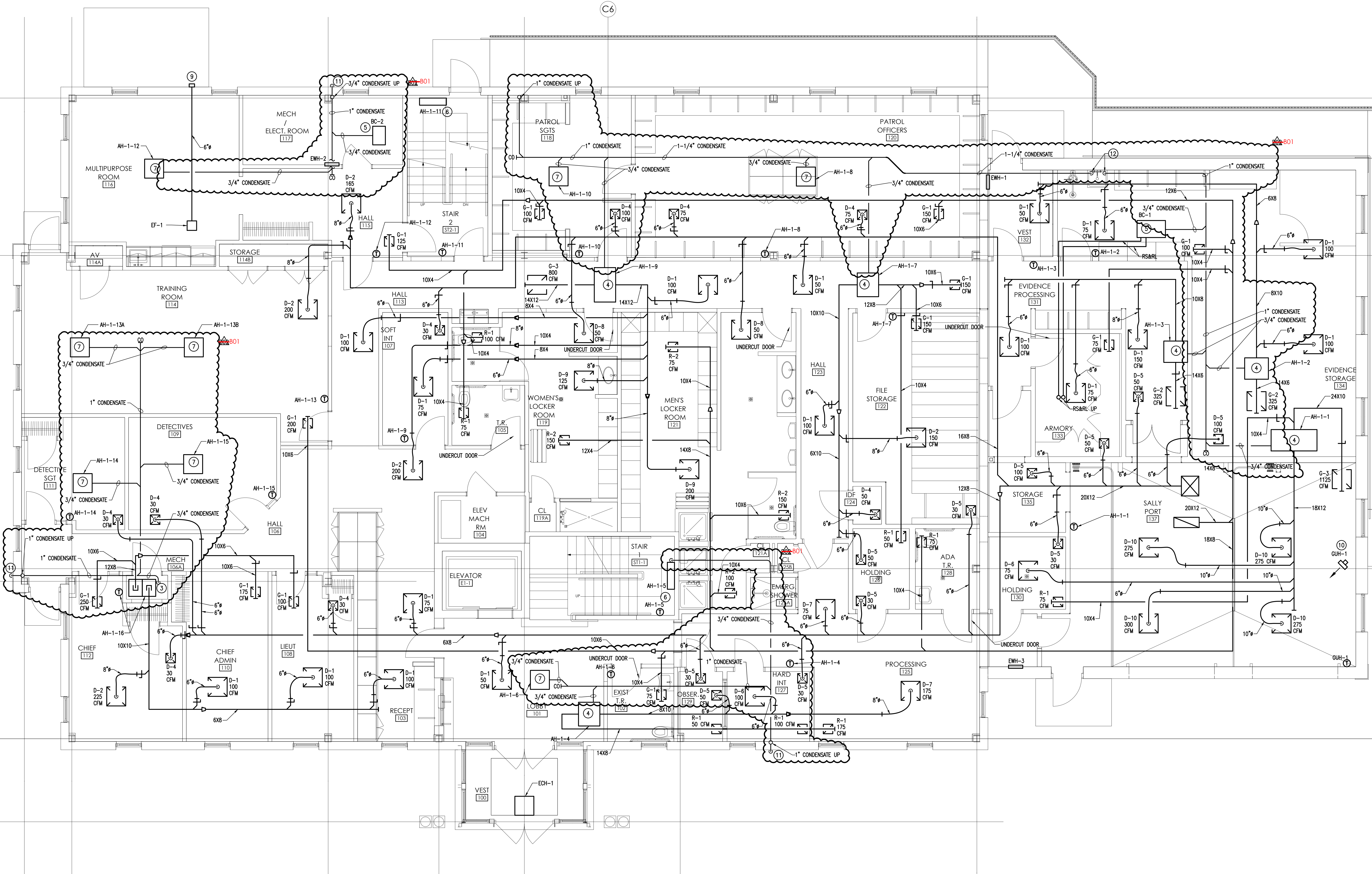
PROJ. MGR.: ANGELO MARTARANO, PE  
@MAIL: AMARTARANO@MARTARANOENGINEERING.COM  
DRAWN BY: AG, KR  
CLIENT PROJ #.: -  
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SHEET TITLE:  
**MECHANICAL  
LEGEND AND  
NOTES**

**M-1**



ID	DESCRIPTION	DATE
001	ISSUED FOR BIDDING	07/06/2024
001	ADDENDUM 1 REVISIONS	07/30/2024



**MECHANICAL — FIRST FLOOR PLAN — NEW WORK**  
SCALE: 1/4" = 1'-0"









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1268 PENN AVE  
WYOMISSING, PA 19610  
610.376.4927  
[www.MG-Architects.com](http://www.MG-Architects.com)

23-0047.0

**MEI**  
**MARTARANO**  
ENGINEERING INC.  
1105 Berkshire Blvd. Suite 14  
Wyomissing, PA 19610  
t:(484)-706-9779  
Project #23-150

PROJECT #: 23-150  
PROFESSIONAL SEAL

ANGELO L. MARTARANO  
MATTHEW PAGE

contact: CHRISTOPHER CAGGIANO  
2199 BUCHERT ROAD  
POTTSTOWN, PA 19646  
610-310-1759  
ccaggiano1@gmail.com

LOWER POTTS GROVE TWP  
LOWER POTTS GROVE MUNICIPAL  
BLDG & POLICE STATION  
1963 E HIGH ST.  
POTTSTOWN, PA 19464

### CONSTRUCTION DOCUMENTS REVISION HISTORY

ID	DESCRIPTION	DATE
801	ISSUED FOR BID/PERMIT	09/04/2024
	ADDENDUM 5 REVISIONS	09/30/2024

PROJ. MGR.: ANGELO MARTARANO, PE  
E-MAIL: AMARTARANO@MARTARANOENGINEERING.COM

DRAWN BY: AG, I

CLIENT PROJ #: -

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## MECHANICA SCHEDULES

M-8

B01

REF	NO	MANUFACTURER/ MODEL NO	SUPPLY AIR (CFM)	EXHAUST AIR (CFM)	SUPPLY AIR EFFICIENCY %	ENERGY RECOVERY WHEEL SCHEDULE												REMARKS
						COOLING MODE						HEATING MODE						
						OUTDOOR AIR DB (F)	WB (F)	RETURN AIR DB (F)	WB (F)	SUPPLY AIR DB (F)	WB (F)	OUTDOOR AIR DB (F)	WB (F)	RETURN AIR DB (F)	WB (F)	SUPPLY AIR DB (F)	WB (F)	
DOAS-1		AAON / ERC-3019C	1400	1400	0.72	95	75	75	62	80.4	66.2	10	9	70	50	52.2	39.9	100% OA; INTEGRAL TO DOAS-1
DOAS-2		AAON / ERC-3019C	1400	1400	0.72	95	75	75	62	80.4	66.2	10	9	70	50	52.2	39.9	100% OA; INTEGRAL TO DOAS-2

DEDICATED OUTDOOR AIR SYSTEM SCHEDULE																																					
REF NO	MANUFACTURER/ MODEL NO	SUPPLY FAN SECTION			EXHAUST FAN SECTION			HEATING SECTION				COOLING SECTION												ELECTRICAL CHARACTERISTICS					OUTSIDE AIR		REMARKS						
		AIR FLOW (CFM)	EXT SP (° WG)	RPM	MOTOR		AIR FLOW (CFM)	EXT SP (° WG)	RPM	MOTOR		CAPACITY (MBH)		STAGES (#)	MIN EFF (%)	NET CAPACITY (MBH)		EAT (° F)		LAT (° F)		COND EAT (° F)	MIN EER									MIN IEER	COND FANS		COMPRESSORS		
					(BHP)	(HP)				(BHP)	(HP)	INPUT	OUTPUT			TOTAL	SENS	DB	WB	DB	WB			(NO)	(FLA) EACH	(NO)	(RLA)	COOLING STAGES									
DOAS-1	AAON / RN-007-8-0-EB09-32B	1,400	0.75	1,950	0.9	1	1,400	0.75	1,897	0.68	2	90	72.9	MOD (10:1)	81	110.9	65.4	80.4	66.2	48.9	48.9	95	12.3	14.8	1	2.8	1	20.4	VARIABLE	208	3	60	41	60	1,400	1,400	[1][2][3][4][5][6][7][8][9]
DOAS-2	AAON / RN-007-8-0-EB09-32B	1,400	0.75	1,950	0.9	1	1,400	0.75	1,897	0.68	2	90	72.9	MOD (10:1)	81	110.9	65.4	80.4	66.2	48.9	48.9	95	12.3	14.8	1	2.8	1	20.4	VARIABLE	208	3	60	41	60	1,400	1,400	[1][2][3][4][5][6][7][8]
NOTES:																																					
[1] - PROVIDE WITH PLATFORM ROOF CURB FOR HORIZONTAL DISCHARGE																																					
[2] - PROVIDE WITH MODULATING HOT GAS REHEAT																																					
[3] - PROVIDE WITH VARIABLE SPEED DIGITAL COMPRESSORS																																					
[4] - PROVIDE WITH FACTORY START-UP																																					
[5] - PROVIDE WITH INTEGRAL ERV (SEE SEPARATE SCHEDULE FOR PERFORMANCE)																																					
[6] - PROVIDE WITH MERV 13 FILTERS																																					
[7] - PROVIDE WITH FACTORY INSTALLED NON-FUSED DISCONNECT W/ 115V OUTLET																																					
[8] - PROVIDE WITH CONDENSER HAILGUARD																																					
[9] - PROVIDE WITH DOWN DISCHARGE ROOF CURB																																					



ID	DESCRIPTION	DATE
001	ISSUED FOR BIDDING	09/06/2024
001	ADDENDUM 1 REVISIONS	09/30/2024

## GENERAL NOTES

- ELECTRICAL CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES AND PROVIDE ALL MATERIALS, DEVICES, CONNECTIONS, ETC. FOR A COMPLETE AND FUNCTIONAL INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK WITH SUPPLIERS, SUBCONTRACTORS, EMPLOYEES, ETC. SHOULD CLARIFICATION OF ANY PORTION OF THE WORK BE REQUIRED, CONTACT THE ARCHITECT/ENGINEER PRIOR TO SUBMITTING BID.
- SYMBOLS, ABBREVIATIONS, DETAILS, SCHEDULES, AND DRAWINGS NOTES ARE PROVIDED FOR INFORMATIONAL PURPOSES. NOT ALL SYMBOLS, ABBREVIATIONS, DETAILS, SCHEDULES, AND DRAWING NOTES MAY APPLY. COORDINATE ANY DISCREPANCIES WITH ENGINEER.
- WORK SHALL COMPLY WITH CODE AS REQUIRED BY LOCAL AUTHORITY. THIS WOULD INCLUDE, BUT IS NOT LIMITED TO THE INTERNATIONAL BUILDING CODE (IBC) AND THE NATIONAL ELECTRICAL CODE (NEC), AMENDMENTS, NFPA, ANSI, OSHA, AND ALL OTHER LOCAL OR MUNICIPAL BUREAUS AND DEPARTMENTS WHICH HAVE AUTHORITY OVER THE PROJECT; ANYTHING IN THESE CONTRACT DOCUMENTS NOT WITHSTANDING, THIS SHALL NOT BE CONSTRUED AS WAIVING COMPLIANCE WITH ANY REQUIREMENTS OF THE PLANS AND SPECIFICATIONS WHICH MAY BE IN EXCESS OF ANY REQUIREMENTS OF THESE CODES.
- THE CONTRACTOR SHALL COMPARE THE DRAWINGS AND SPECIFICATIONS, CHECKING THE MEASUREMENTS AND CONDITIONS UNDER WHICH CONSTRUCTION IS TO BE IMPLEMENTED. FOR CLARIFICATION BETWEEN VARIOUS DRAWINGS AND/OR SPECIFICATIONS, THE DISPUTED ISSUE SHALL BE REFERRED TO THE ENGINEER PRIOR TO ANY WORK. THE CONTRACTOR SHALL STATE IN THEIR PROPOSAL ANY EXCEPTIONS NECESSARY TO MAKE THIS WORK A COMPLETE AND READY-TO-USE INSTALLATION. IF NOT SO-STATED IN THE CONTRACTOR'S PROPOSAL, ANY SUCH WORK WILL NOT BE CONSIDERED ADDITIONAL.
- THE CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF ALL REQUIRED WORK AND EQUIPMENT WITH THAT OF THE OTHER TRADES. WHERE THERE ARE POTENTIAL CONFLICTS, THE CONTRACTOR SHALL OBTAIN AND VERIFY EXACT LOCATIONS, MEASUREMENTS, LEVELS, SPACE REQUIREMENTS, ETC. AT THE SITE AND SHALL ADAPT HIS WORK TO ACTUAL FIELD CONDITIONS. REFER TO ARCHITECTURAL/MECHANICAL DRAWINGS FOR PLANS, ELEVATIONS AND DETAILS INDICATING THE LOCATIONS OF CEILING ELEMENTS (E.G., LIGHTS, SPRINKLERS, DIFFUSERS, ETC.) AND WALL ELEMENTS. CEILING MOUNTED ITEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE ARCHITECTURAL REFLECTED CEILING PLANS. IF LOCATION FOR AN ITEM IS NOT SHOWN ON THE ARCHITECTURAL DRAWINGS, VERIFY THE EXACT LOCATION OF THE ITEM WITH THE ARCHITECT PRIOR TO INSTALLATION. THESE REQUIREMENTS APPLY TO ALL CEILING TYPES IN ALL AREAS. CONTRACTOR GENERATED COORDINATION DRAWINGS ARE REQUIRED.
- THE CONTRACTOR SHALL CAREFULLY EXAMINE THE CONTRACT DOCUMENTS, VISIT THE SITE, EXAMINE THE PREMISES, AND MAKE A THOROUGH SURVEY OF THE CONDITIONS UNDER WHICH CONSTRUCTION WILL BE IMPLEMENTED. THE SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. FAILURE TO DO SO SHALL NOT RELIEVE THE CONTRACTOR OF THE OBLIGATIONS OF THE CONTRACT. ANY LATER CLAIMS FOR LABOR, EQUIPMENT, OR MATERIALS REQUIRED FOR DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE, WILL NOT BE RECOGNIZED.
- THE CONTRACTOR SHALL SECURE, OBTAIN AND PAY FOR ALL PERMITS, INSPECTIONS, TAXES, LICENCE, AND FEES TO ALL GOVERNMENT AGENCIES REQUIRED FOR THE EXECUTION AND COMPLETION OF THE ELECTRICAL WORK. SCHEDULING OF ALL REQUIRED INSPECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL PREPARE AND SUBMIT ALL SHOP DRAWINGS AS REQUIRED TO THE GOVERNMENTAL AGENCIES AND UTILITY COMPANIES FOR THEIR APPROVAL.
- THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO ENSURE THE SAFETY OF THE CLIENT'S EMPLOYEES, BUILDING EMPLOYEES AND GUESTS AS WELL AS THEIR OWN FORCES, BY ADEQUATELY PROTECTING ANY EXPOSED LIVE CABLE, EQUIPMENT, OR DEVICES THROUGHOUT THE COURSE OF THIS WORK.
- ALL CONTRACTORS/BIDDERS SHALL HAVE RECEIVED A COMPLETE SET OF CONSTRUCTION DOCUMENTS FOR REVIEW AND REFERENCE TO WORK INDICATED. CONDUIT LOCATE SERVICES SHALL BE REQUESTED AND COMPLETED BEFORE DISTURBANCE OF ANY EXISTING GRADE OR ON-GRADE CONSTRUCTION, SLAB DEMOLITION, OR OTHER ACTIVITIES THAT MAY IMPACT BURIED UTILITIES OR COMMUNICATION CONDUITS. THE CONTRACTOR SHALL CONFIRM THAT CONDUIT LOCATE SERVICES HAVE BEEN COMPLETED AND THAT NO POTENTIAL CONFLICTS EXIST BEFORE EXISTING GRADE IS EXCAVATED OR EXISTING FLOORING DEMOLISHED, REGARDLESS OF THE LOCATION ON THE PROPERTY. THIS SHALL BE REVIEWED WITH THE OWNER'S PROJECT REPRESENTATIVE.
- THE CONTRACTOR SHALL PROVIDE THE COMPLETE ELECTRICAL INSTALLATION OF WORK AS INDICATED IN THE CONSTRUCTION DOCUMENTS. PRIOR TO COMMENCEMENT, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL, ANY SEQUENCE OF WORK, MOP'S (METHOD OF PROCEDURE) AND/OR COORDINATION SHOP DRAWINGS FOR THE INTENDED WORK. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER OF ANY MATERIALS OR APPARATUS BELIEVED TO BE INADEQUATE, UNSUITABLE, VIOLATION OF LAWS, ORDINANCES, RULES OR REGULATIONS OF AUTHORITIES HAVING JURISDICTION.
- THE CONTRACTOR SHALL PROVIDE ALL "AS-BUILT" DRAWINGS SCALED 1/4" MINIMUM AND SUBMIT FOR APPROVAL TO THE ARCHITECT/ENGINEER.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY POWER AND LIGHTING FOR THIS WORK DURING CONSTRUCTION. TEMPORARY LIGHTING SHALL AT LEAST BE THE EQUAL OF (1)100-WATT FIXTURE EVERY 100 SQUARE FEET, WITH A MINIMUM ONE FIXTURE PER ROOM. TEMPORARY LIGHTING SHALL BE LEFT IN PLACE UNTIL PERMANENT LIGHTING IS COMPLETELY OPERATIONAL. COORDINATE TEMPORARY POWER REQUIREMENTS WITH THE OTHER TRADES AND PROVIDE ADEQUATE PROVISIONS. THE CONTRACTOR SHALL PERFORM ALL COORDINATION WITH THE OWNER AND/OR LANDLORD AND UTILITY COMPANY.
- ALL MATERIALS AND EQUIPMENT PROVIDED IN THIS WORK SHALL BE NEW AND SHALL HAVE THE APPROPRIATE UL LISTING AND/OR FM APPROVAL.
- THE CONTRACTOR SHALL PERFORM ALL COORDINATION AND SCHEDULING OF THE INSTALLATION OF THE NEW ELECTRICAL SERVICE WITH THE LOCAL UTILITY COMPANY.

## RECEPTACLES

- DUPLEX RECEPTACLE - 2 POLE, 3 WIRE GROUNDING, 20 AMP, 125 VOLT, NEMA 5-20R  
MOUNT @ 1'-6" AFF CENTERLINE UNLESS OTHERWISE NOTED
- QUAD RECEPTACLE (2 DUPLEX RECEPTACLES IN SAME BOX)  
MOUNT @ 1'-6" AFF CENTERLINE UNLESS OTHERWISE NOTED
- FLOOR BOX WITH DUPLEX RECEPTACLE
- GROUND FAULT CIRCUIT INTERRUPTING DUPLEX RECEPTACLE  
2 POLE, 3 WIRE GROUNDING, 20 AMP, 125 VOLT, NEMA 5-20R  
MOUNT @ 1'-6" AFF CENTERLINE UNLESS OTHERWISE NOTED
- DUPLEX RECEPTACLE - 2 POLE, 3 WIRE GROUNDING, 20 AMP, 125 VOLT, NEMA 5-20R. PROVIDE WITH SEPARATE ACCESSIBLE DEAD FRONT GFCI DEVICE.  
MOUNT @ 1'-6" AFF CENTERLINE UNLESS OTHERWISE NOTED
- UL LISTED WEATHERPROOF ENCLOSURE WITH GROUND FAULT CIRCUIT INTERRUPTING WEATHER RESISTANT TYPE DUPLEX RECEPTACLE  
MOUNT 2'-0" AFF/AFG CENTERLINE, UNLESS OTHERWISE NOTED
- TAMPER RESISTANT DUPLEX RECEPTACLE  
2 POLE, 3 WIRE GROUNDING, 20 AMP, 125 VOLT, NEMA 5-20R  
MOUNT @ 1'-6" AFF CENTERLINE, UNLESS OTHERWISE NOTED

## SINGLE LINE

- ELECTRICAL TRANSFORMER  
TYPE/SIZE AS INDICATED ON DRAWINGS
- CIRCUIT BREAKER  
TYPE/SIZE AS INDICATED ON DRAWINGS
- ELECTRODE GROUNDING CONDUCTOR/SYSTEM

## POWER

- 1 CIRCUIT HOME RUN TO PANEL  
2 #12 & 1 #12G, 3/4" CND, UNLESS OTHERWISE NOTED
- DIRECT CURRENT CIRCUIT RUN CONCEALED  
2#10, 3/4" CND, UNLESS OTHERWISE NOTED
- BRANCH CIRCUIT RUN CONCEALED - 2 #12 & 1 #12G, 3/4" CND, UNLESS OTHERWISE NOTED  
PROVIDE ADDITIONAL SWITCHED CONDUCTORS AS REQUIRED
- BRANCH CIRCUIT RUN BELOW GRADE  
MINIMUM COVER, DEPTH AS PER NEC
- MOTOR STARTER RELAY
- JUNCTION BOX
- PANELBOARD - SURFACE MOUNTED  
MOUNT 6'-0" TO TOP OF HIGHEST BREAKER  
RATINGS AS INDICATED ON DRAWINGS
- DISCONNECT SWITCH. NUMBER OF POLES, AMPERE RATING, VOLTAGE, NEMA TYPE ENCLOSURE AS INDICATED.  
MOUNT 4'-0" AFF TO CENTERLINE OF HANDLE.
- ENCLOSED MOLDED CASE CIRCUIT BREAKER. NUMBER OF POLES, AMPERE RATING AND NEMA TYPE ENCLOSURE AS INDICATED. MOUNT 4'-0" AFF TO CENTERLINE OF HANDLE.

## GENERAL

- REFER TO INDICATED DEMOLITION NOTE
- REFER TO INDICATED NEW WORK LIGHTING NOTE
- REFER TO INDICATED NEW WORK POWER NOTE
- REFER TO INDICATED NEW WORK MECHANICAL POWER NOTE
- REFER TO INDICATED NEW WORK FIRE ALARM NOTE

## LIGHTING

- LIGHTING FIXTURE, LETTER SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE. LOWERCASE LETTER INDICATES SWITCH CIRCUIT.
- EMERGENCY LIGHTING FIXTURE, LETTER SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE.
- NIGHT LIGHT FIXTURE, LETTER SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE.
- NORMAL EXIT SIGN. ARROWS INDICATE DIRECTION OF EXIT. SOLID FILL INDICATES NUMBER OF FACES, LETTER SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE.
- EMERGENCY LIGHTING BATTERY UNIT TO PROVIDE 1 1/2 HOURS OF EMERGENCY LIGHT. LETTER SUBSCRIPT INDICATES SCHEDULED
- LOW VOLTAGE REMOTE EMERGENCY LIGHTS. LETTER SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE.
- COMBINATION EXIT SIGN/EMERGENCY LIGHT. SUBSCRIPT INDICATES NUMBER OF FACES, LETTER SUBSCRIPT INDICATES SCHEDULED FIXTURE TYPE.
- SINGLE POLE TOGGLE TYPE A/C SWITCH  
20 AMP, 120/277 VOLT  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED
- THREE WAY TOGGLE TYPE A/C SWITCH  
20 AMP, 120/277 VOLT  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED
- FOUR WAY TOGGLE TYPE A/C SWITCH  
20 AMP, 120/277 VOLT  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED
- MANUAL MOTOR STARTER  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED
- SINGLE POLE 0-10V DIMMER SWITCH  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED
- AUTOMATIC TIMER SWITCH - TORK #SSA200R  
20 AMP, 120/277 VOLT  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED  
\*-PRESET FOR MAXIMUM OF 2 HOUR OVERIDE.
- OCCUPANCY SENSOR WALL SWITCH.  
WATT STOPPER DW-100 OR APPROVED EQUAL  
MOUNT @ 3'-10" AFF, UNLESS OTHERWISE NOTED
- LOW VOLTAGE WALL STATION  
NXSWR-ORLO SERIES OR APPROVED EQUAL \* - DENOTES SYSTEM/AREA OF CONTROLLER AND CONNECTED DEVICES
- OCCUPANCY SENSOR  
NX-ORLO SERIES OR APPROVED EQUAL
- DUAL TECHNOLOGY CEILING MOUNTED OCCUPANCY SENSOR  
WATT STOPPER DT300 OR APPROVED EQUAL  
LOWERCASE LETTER INDICATES LINKED SENSORS  
TIMELOCK  
LIGHTING CONTACTOR

## SIGNAL

- COMMUNICATIONS DEVICE BOX WITH CAT6 CABLE  
MOUNT 1'-8" AFF, UNLESS OTHERWISE NOTED  
BLANK SPACE DESIGNATES QUANTITY OF CABLES AND TERMINATION  
NO DESIGNATION IS ONE TERMINATION AND ONE WIRE
- FLOOR BOX WITH COMPUTER DEVICE BOX WITH CAT6 CABLE
- CARD READER BACK BOX WITH CONDUIT AND PULL STRING TO ABOVE ACCESSIBLE CEILING
- WIRELESS ACCESS POINT WITH CAT6 CABLE
- SECURITY CAMERA - CEILING MOUNTED BACK BOX WITH SCONDUIT AND PULL STRING TO ABOVE ACCESSIBLE CEILING
- RECORDING CAMERA OF BACK BOX AND CAT6 CABLE TO IT ROOM OR OWNER DESIGNATED LOCATION
- TELEVISION CABLE DEVICE BOX WITH RG6 CABLE  
MOUNT 54" AFF, UNLESS OTHERWISE NOTED
- ACTIVE OPTICAL HDMI LOCATION  
PROVIDE GROMMET, COVER PLATE, BACKBOX, AND MINIMUM 2" RACENWAY, AND CABLE AS NOTED ON THE DRAWINGS. RACENWAY SIZE SHALL BE DEPENDANT ON SIZE AND QUANTITY AND CABLE

## FIRE ALARM

- COMBINATION FIXED TEMPERATURE RATE-OF-RISE SYSTEM THERMAL DETECTOR - CEILING MOUNT
- MANUAL FIRE ALARM PULL STATION  
MOUNT @ 3'-8" AFF, UNLESS OTHERWISE NOTED
- FIRE ALARM HORN WITH VISUAL INDICATING LIGHT  
MOUNT @ 7'-6" AFF  
# = CANDELA RATING WHEN HIGHER THAN 15
- FIRE ALARM VISUAL INDICATING LIGHT ONLY (ADA APPROVED) MOUNT @ 7'-6" AFF  
# = CANDELA RATING WHEN HIGHER THAN 15
- FIRE ALARM HORN WITH VISUAL INDICATING LIGHT  
CEILING MOUNT  
# = CANDELA RATING WHEN HIGHER THAN 15
- PHOTOELECTRIC SYSTEM SMOKE DETECTOR - CEILING MOUNT
- FIRE ALARM ANNUNCIATOR PANEL

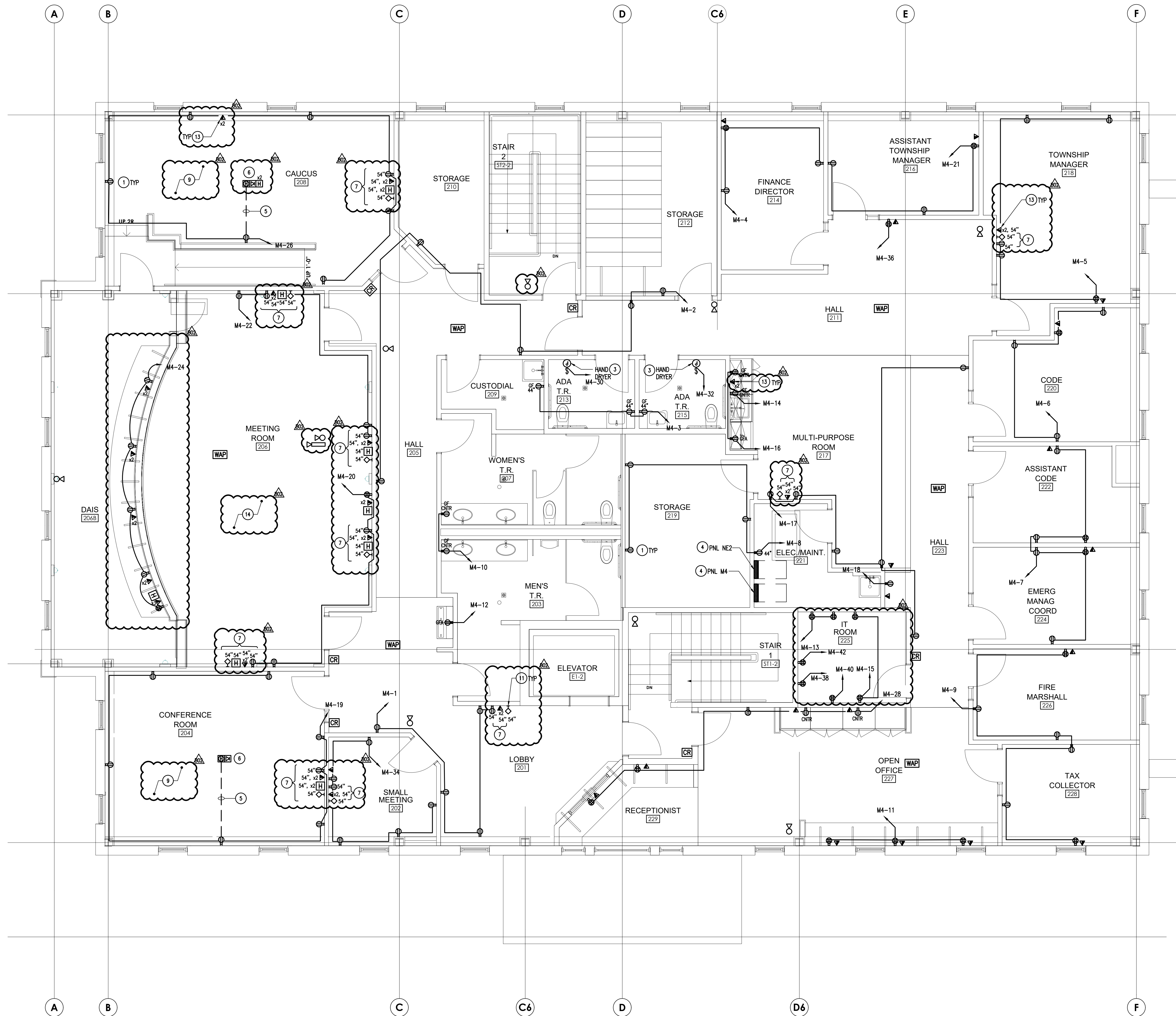
## ABBREVIATIONS

- AT AND NUMBER
- AMP AMPERE
- AC ALTERNATING CURRENT
- AFS ABOVE FINISHED FLOOR
- APPROX APPROXIMATELY
- AVG AVERAGE
- BKR BREAKER
- CB CIRCUIT BREAKER
- CKT CIRCUIT
- CND CONDUIT
- CNTR MOUNT 8" ABOVE COUNTERTOP
- CORR CORRIDOR
- CT CURRENT TRANSFORMER
- DC DIRECT CURRENT
- DISC DISCONNECT
- DWG DRAWING
- EC ELECTRICAL CONTRACTOR
- EF EXHAUST FAN
- ELEC ELECTRIC, ELECTRICAL
- ELEV ELEVATOR
- EMER EMERGENCY
- EMT ELECTRICAL METALLIC TUBING
- F FAN
- FAA FIRE ALARM ANNUNCIATOR PANEL
- FACP FIRE ALARM CONTROL PANEL
- FTL FEED THROUGH LUGS
- FU FUSE
- G GROUND
- GA GAUGE
- GF GROUND FAULT
- HP HORSEPOWER
- HT HEIGHT
- IN INCH
- J JUNCTION BOX
- KAIC THOUSAND AMPS INTERRUPTING CURRENT
- KCM 1000 CIRCULAR MILLS
- KVA KILOVOLT-AMPERE
- KW KILOWATT
- LTG LIGHTING
- MCB MAIN CIRCUIT BREAKER
- MISC MISCELLANEOUS
- MLO MAIN LUGS ONLY
- NEC NATIONAL ELECTRICAL CODE
- NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- NTS NOT TO SCALE
- P POLE
- PH PHASE
- PNL PANEL
- RECP RECEPTACLE
- REF REFERENCE
- REV REVISION
- RM ROOM
- SHT SHEET
- SPEC SPECIFICATION
- TYP TYPICAL
- V VOLTAGE, VOLTS
- W WATT
- W WIRE
- W/ WITH
- W/O WITHOUT
- WH WATER HEATER
- WP WEATHERPROOF
- X BY (BETWEEN DIMENSIONS)
- XFER TRANSFORMER









ELECTRICAL - SECOND FLOOR PLAN - NEW WORK POWER & SIGNAL  
SCALE: 1/4" = 1'-0"

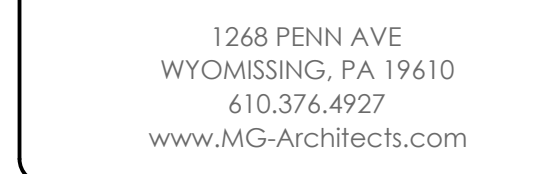
NEW WORK POWER & SIGNAL NOTES:

- VERIFY EXACT LOCATION AND/OR MOUNTING HEIGHT OF ALL DEVICES (I.E. RECEPTACLES, TELE/DATA, ETC) WITH OWNER PRIOR TO ROUGH-IN.
- FIELD LOCATE FOR POWER TO AUTOMATIC DOOR OPERATOR. PROVIDE WIRE AND CONDUIT TO SENSORS AND CONTROLS PER MANUFACTURER'S INSTRUCTIONS AND TO DOOR LOCK CONTROL PANEL.
- PROVIDE JUNCTION BOX FOR CONNECTION OF HAND DRYER. PROVIDE MANUFACTURER'S PROVISIONS FOR CIRCUIT WITH LOCKABLE BREAKER IN THE OPEN POSITION IN PANEL.
- COORDINATE MOUNTING OF ELECTRICAL PANELS WITH OTHER TRADES TO MAINTAIN CODE REQUIRED CLEARANCES IN FRONT OF PANEL PER NEC. REQUIRED WORKING CLEARANCE SHALL BE MAINTAINED AT ALL TIMES AND SHALL NOT BE USED FOR STORAGE, ADDITIONAL EQUIPMENT, ETC.
- CONTRACTOR INSTALL TWO NEW CONDUITS, ONE 2" CONDUIT FOR TELE/DATA AND ONE 1" CONDUIT FOR POWER IN ACCESSIBLE CEILING.
- PROVIDE POKE THRU DEVICE (ST1PTT) FLOOR BOX AND COVERPLATE SHALL BE FLUSH WITH TOP OF FINISHED FLOOR. VERIFY WITH ARCHITECT EXACT TYPE OF FINISHED FLOOR AND INSTALLATION DETAILS PRIOR TO INSTALLATION OF BOX.
- RECEPTACLE AND DATA OUTLET SHALL BE MOUNTED AT 54 INCHES ABOVE FINISHED FLOOR. PROVIDE LEGRAND TV2MM FOR MOUNTING OF RECESSED DEVICES. CONFIRM LOCATION WITH OWNER PRIOR TO ROUGH-IN.
- IN ADDITION TO POWER CONDUITS SHOWN ON SINGLE LINE DIAGRAM AND PLAN VIEW, PROVIDE SEPARATE CONDUITS (MIN 1") FOR CONTROL TO GENERATOR ANNUNCIATOR PANEL AND MAIN/ATS.
- PROVIDE 50 FEET OF ACTIVE OPTICAL HDMI CABLE (AOC) AT EACH DESIGNATED HDMI LOCATION. ACTIVE OPTICAL CABLE (AOC) SHALL BE MALE TO MALE GOLD PLATED, PVC JACKET, 4K RESOLUTION, AND 26 AWG WIRE. CONTRACTOR SHALL HOLD IN BID THE COST TO PROVIDE GROMMET, COVER PLATE, BACKBOX, AND RACEWAY AT THE END OF CABLE. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS WITH OWNER.
- PROVIDE ACTIVE OPTICAL HDMI CABLE (AOC) AT EACH DESIGNATED HDMI LOCATION TO AV 114. ACTIVE OPTICAL CABLE (AOC) SHALL BE MALE TO MALE GOLD PLATED, PVC JACKET, 4K RESOLUTION, AND 26 AWG WIRE. CONTRACTOR SHALL HOLD IN BID THE COST TO PROVIDE GROMMET, COVER PLATE, BACKBOX, AND RACEWAY AT THE END OF CABLE. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS WITH OWNER.
- ALL RGS TO HOME RUN TO MECH/ELEC 117 ON FIRST FLOOR.
- ALL CAT6 CABLE ON FIRST FLOOR TO HOME RUN TO IDF CLOSET 124 ON FIRST FLOOR.
- ALL CAT6 CABLE ON SECOND FLOOR TO HOME RUN TO IT ROOM 225 ON SECOND FLOOR.
- PROVIDE 100 FEET OF ACTIVE OPTICAL HDMI CABLE (AOC) AT EACH DESIGNATED HDMI LOCATION TO AV 114. ACTIVE OPTICAL CABLE (AOC) SHALL BE MALE TO MALE GOLD PLATED, PVC JACKET, 4K RESOLUTION, AND 26 AWG WIRE. CONTRACTOR SHALL HOLD IN BID THE COST TO PROVIDE GROMMET, COVER PLATE, BACKBOX, AND RACEWAY AT THE END OF CABLE. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS WITH OWNER.

ID	DESCRIPTION	DATE
800	ISSUED FOR BID/PERMIT	09/06/2024
801	ADDENDUM 3 REVISIONS	09/20/2024
802	ADDENDUM 5 REVISIONS	09/30/2024








CONSULTANT

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26



ANGELO L. MARTARANO  
MATTHEW RACE

contact: CHRISTOPHER CAGGIANO  
2199 BUCHERT ROAD  
POTTSTOWN, PA 19646  
610-310-1759  
ccaggiano1@aol.com

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SUBJECT: \_\_\_\_\_

SHEET TITLE:

ELECTRICAL  
FIRST FLOOR  
FIRE ALARM

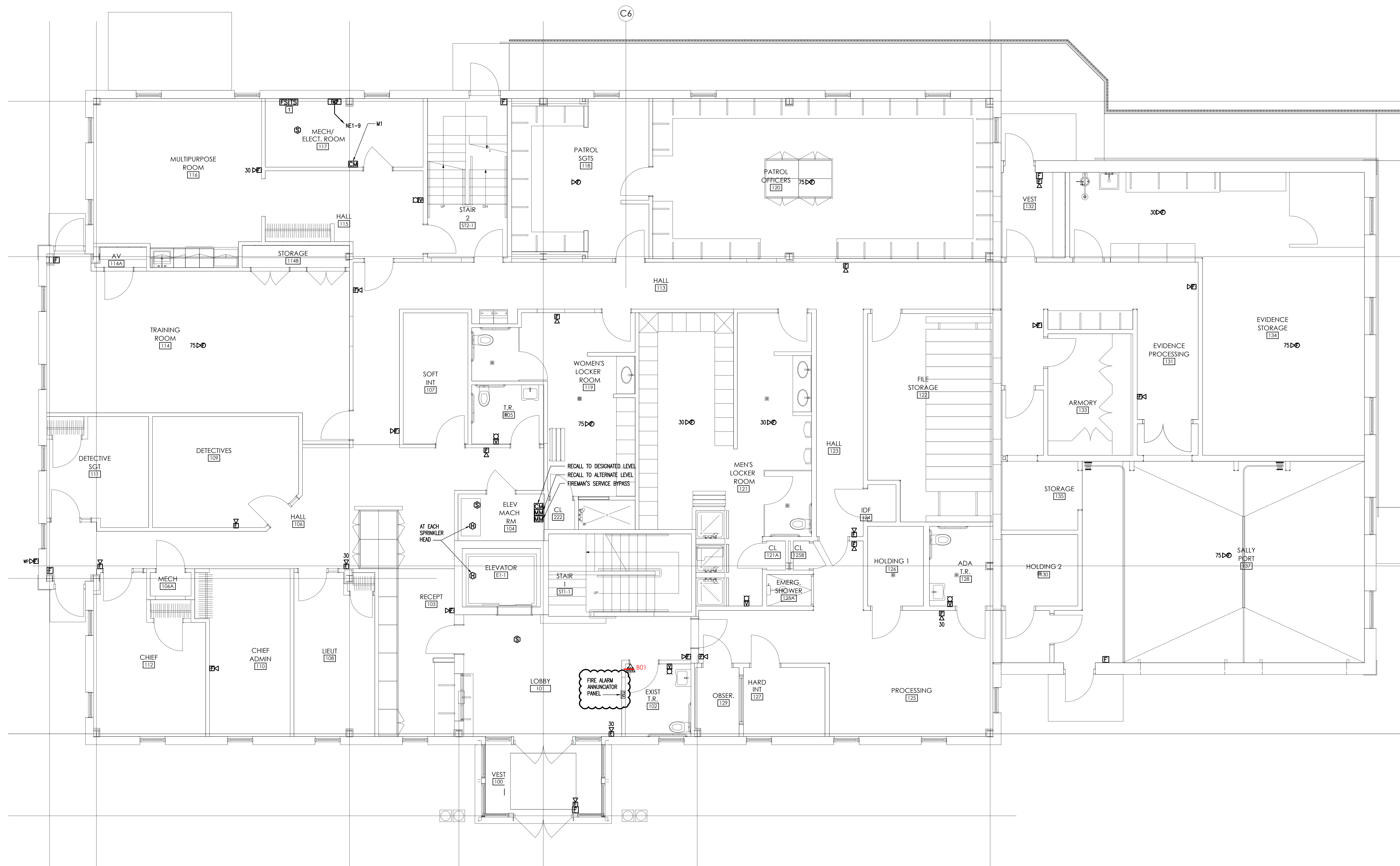
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5 10

F-10

10



ELECTRICAL - FIRST FLOOR PLAN - NEW WORK FIRE ALARM  
SCALE: 1/4" = 1'-0"

GENERAL DRAWING NOTES:

1. REFER TO DRAWING E-11 FOR NEW WORK  
FIRE ALARM POWER NOTES.





1268 PENN AVE  
WYOMISSING, PA 19610  
610.376.4927  
[www.MG-Architects.com](http://www.MG-Architects.com)

23-0047.0

1105 Berkshire Blvd. Suite 140  
Wyomissing, PA 19610  
t:(484)-706-9779  
Project #23-150

ANGELO L. MARTARANO  
MATTHEW PAGE

contact: CHRISTOPHER CAGGIANCO  
2199 BUCHERT ROAD  
POTTSTOWN, PA 19646  
610-310-1759  
ccaggiano1@aol.com

1963 E HIGH ST.  
POTTSTOWN PA 19464

PROJ. MGR.: ANGELO MARTARANO, PE  
e-MAIL: AMARTARANO@MARTARANOENGINEERING.COM  
DRAWN BY: AG, KR

CLIENT PROJ #.	
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BAR IS ONE (1) INC.

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## ELECTRICAL PANEL SCHEDULES

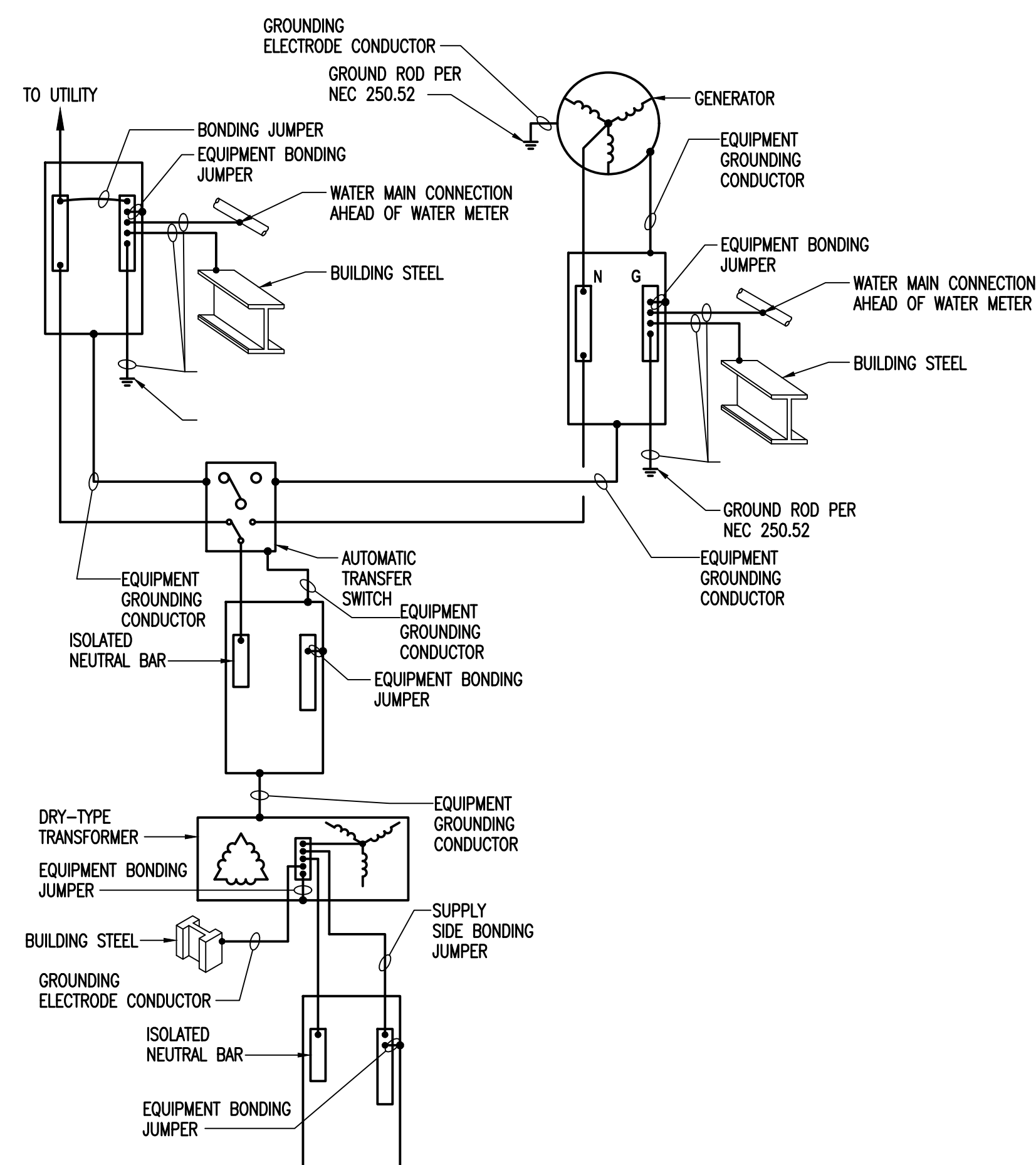
E-13

BOBO1B01



[illegible]

B01



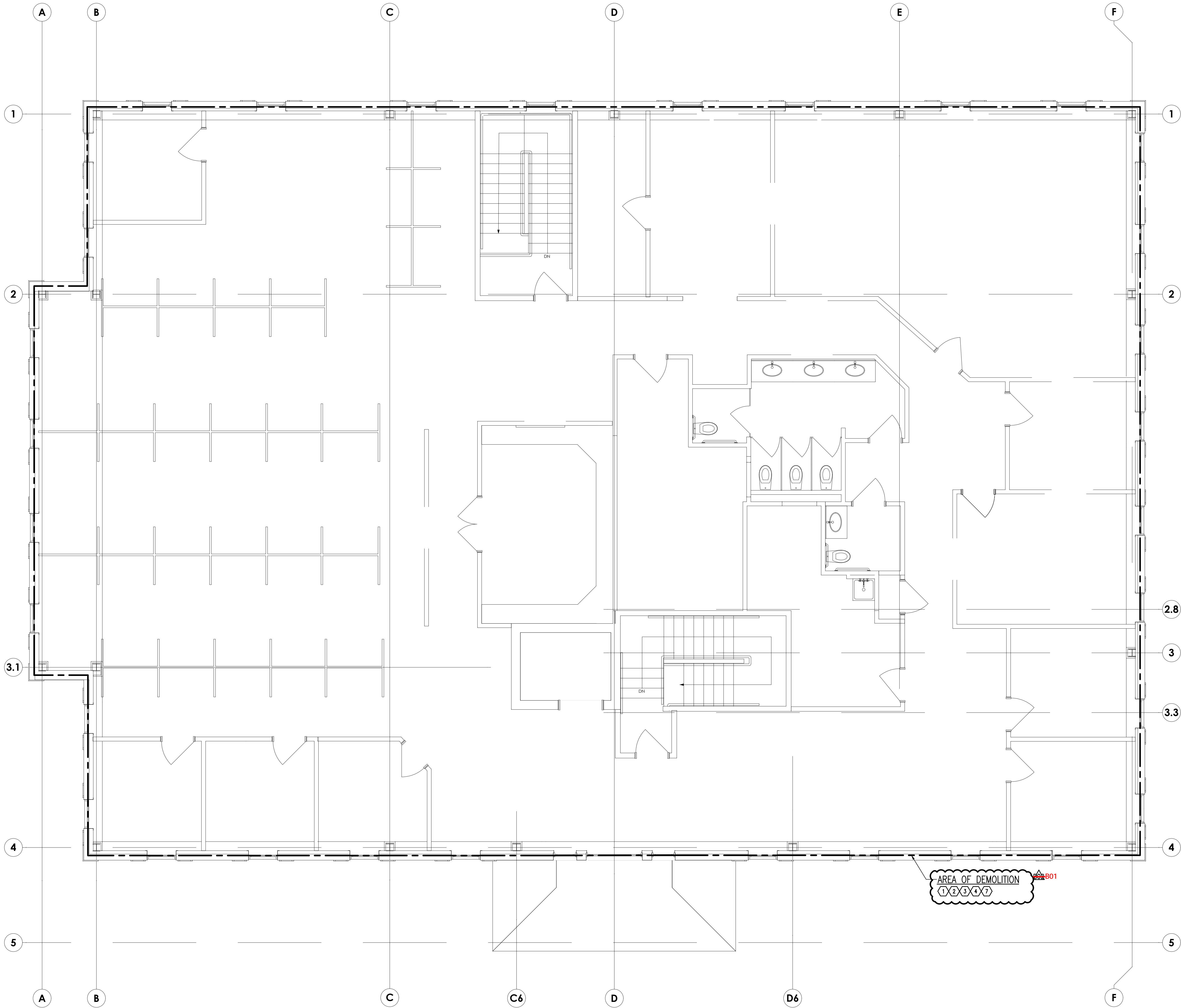
TYPICAL GROUNDING SYSTEM DETAIL

SCALE: NONE  
NOTES:

1. REFER TO SINGLE LINE DIAGRAM FOR WIRE SIZES IF NOT NOTED





FIRE PROTECTION – SECOND FLOOR PLAN – DEMOLITION  
SCALE: 1/4" = 1'-0"

GENERAL NOTES  
REFER TO FP-1 FOR LEGEND,  
GENERAL NOTES, AND DEMOLITION  
NOTES.



ARCHITECTURAL DESIGN  
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1208 PENN AVE  
WYOMISSING, PA 19610  
610.376.4927  
www.MG-Architects.com

PROJECT #:  
23-0047.0

CONSULTANT  
  
**MARTARANO**  
ENGINEERING INC  
1105 Berkshire Blvd. Suite 140  
Wyomissing, PA 19610  
t(494)-706-9779  
Project #23-150

PROJECT #: 23-150  
PROFESSIONAL SEAL

ANGELO L. MARTARANO  
MATTHEW PAGE

LOWER POTTS GROVE TWP  
contact: CHRISTOPHER CAGGIANO  
2199 BUCHERT ROAD  
POTTSTOWN, PA 19446  
610-310-1759  
ccaggiano1@gmail.com

LOWER POTTS GROVE TWP  
1963 E HIGH ST.  
POTTSTOWN, PA 19464

CONSTRUCTION DOCUMENTS REVISION HISTORY		
ID	DESCRIPTION	DATE
800	ISSUED FOR BID/PERMIT	09/06/2024
801	ADDENDUM 3 REVISIONS	09/30/2024

PROJ. MGR.: ANGELO MARTARANO, PE  
EMAIL: AMARTARANO@MARTARANOENGINEERING.COM  
DRAWN BY: AG, KR  
CLIENT PROJ #: -  
SHEET SCALE  
0 1  
BAR SCALE (11 INCH LONG ON ORIGINAL DRAWING)

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SHEET TITLE:  
FIRE PROTECTION  
SECOND FLOOR  
DEMOLITION

FP-2







FP-4