Network Cable Installation Specification and Scope of Work

Version 2.7

March 11, 2019

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Part 1: Introduction

1.1) Introduction

Purchase College (SUNY) located in Purchase, NY, maintains the following specification (hereafter referred to as “Specification”, “the Specification”, or “this Specification”) as a set of requirements for any installation of cables that shall support any data, telephone, audio, video, surveillance, and security services on the Purchase College campus.

1.2) The Terms “Owner” and “the Owner”

The Terms “Owner” and “the Owner” shall represent Purchase College, State University of New York (SUNY) of 735 Anderson Hill Rd., Purchase, NY 10577.

1.3) Applicability of this Specification and the Term “Contractor”

This Specification may be presented in a number of ways, including but not limited to the following:

1.3.1) This Specification may be attached to a request for quotation or request for proposal, in which case this document shall specify requirements for proposed work upon which a vendor shall base its quotation. In this case the terms “Contractor” and “the Contractor” shall represent the vendor who is providing cost quotation/proposal upon which an agreement to perform the work may be reached. By use of the terms “Contractor” and “the Contractor”, Owner conveys no promise or intention that such an agreement will be reached.

1.3.2) This Specification may accompany an order for installation services and materials, in which case it shall serve as requirements by which vendor is to provide requested service and materials should the vendor accept the order. In this case the terms “Contractor” and “the Contractor” shall represent the selected vendor in its obligation to perform the actual work.

1.4) Format

This Specification consists of the following five parts:

Part 1: Introduction
Part 2: General,
Part 3: Materials,
Part 4: Execution
Part 5: Scope of Work

Part 2: General

2) General

2.1) Schedule

Contractor shall submit a proposed schedule in writing to Project Manager, including all of the Project Milestones specified below and the Schedule Requirements specified in the Scope of Work.

Contractor shall complete all work according to any Schedule Requirements specified in the Scope of Work.

If awarded, proposed schedule of successful Contractor shall become the Schedule. Contractor shall adhere strictly to the Schedule and convey any proposed adjustments to the Schedule as a Transmittal to Owner Project Manager, and shall include adjustment to all of the Project Milestones specified below.

Written approval from Owner Project Manager must be obtained by Contractor prior to change of Schedule. If written approval from Owner Project Manager is not obtained by Contractor, then the Schedule remains unchanged and Contractor is obligated to perform according to Schedule.

Project Milestones and Schedule Requirements are as follows:

2.1.1) Materials Delivery Date (if different from the start date)
2.1.2) Start Date
2.1.3) Start of Path Installation (incl. core drilling, conduit, cable tray installation) Date
2.1.4) Completion of Risers Date
2.1.5) Completion of Path Installation Date
2.1.6) Completion of Cable Pulling and Rough-in Date
2.1.7) Fiber-Optic Testing and Labeling Date
2.1.8) Completion of Category 6 / 6A Cable Installation Date
2.1.9) Completion of Fiber-Optic Cable Installation Date
2.1.10) Completion of Telecommunications Feeder Installation Date
2.1.11) Completion of Other Cable Installation Date
2.1.12) Documentation Delivery Date
2.1.13) Project Total Completion Date

2.2) Contractor References

Contractor shall supply along with their bid a list of references of comparable installations, including contact name and telephone number. Owner may elect to perform a site visit to one or more references. Contractor shall note at least one reference that is able to accommodate a site visit by Owner.

2.3) Designated Contacts

2.3.1) Owner Designated Contacts

Owner shall specify the name, mailing address, email address, fax, and telephone numbers for the following persons, hereafter referred to as “Owner Designated Contacts”.

Changes to any Owner Designated Contacts before or during the relevant period of this work shall be communicated to all Designated Contacts by the Owner Project Manager.

Contractor shall communicate exclusively with the Owner Designated Contacts defined below in regard to any matter pertaining to the work described herein.

2.3.1.1) Owner Project Manager

Muneeza Ismail
Capital Facilities Planning

Purchase College
735 Anderson Hill Rd., Purchase NY 10577
(914)251-6916
muneeza.ismail@purchase.edu

2.3.1.2) Owner Technical Contacts

Chris Marsigliano
Campus Technology Services
Purchase College
735 Anderson Hill Rd., Purchase NY 10577
(914)251-643
chris,marsigliano@purchase.edu

William Redding
University Police Department
Purchase College
735 Anderson Hill Rd., Purchase NY 10577
(914)251-6905
William.Redding@purchase.edu

2.3.1.3) Owner Billing Contact

Edward Herran
Purchasing and Accounts Payable Office
Purchase College
735 Anderson Hill Rd., Purchase NY 10577
Phone: (914)251-6070
Fax: (914)251-6075

2.3.1.4) Owner Parking and Transportation Contact

Christine Onderdonk
Parking and Transportation Office
CCN Building, Rm. 1014
Purchase College
735 Anderson Hill Rd., Purchase NY 10577
(914)251-6177
christine.onderdonk@purchase.edu

2.3.1.5) Owner Capital Projects Contact

Sean Connolly
Capital Facilities Planning
Purchase College
735 Anderson Hill Rd., Purchase NY 10577
(914)251-5916

2.3.2) Contractor Designated Contacts

Contractor shall specify the name, mailing address, email address, fax, and telephone numbers for the following persons, hereafter referred to as “Contractor Designated Contacts”.

Changes to any Contractor Designated Contacts before or during the relevant period of this work shall be communicated to all Designated Contact by the Contractor Project Manager.

2.3.2.1) Contractor Project Manager
2.3.2.2) Contractor Field Contact
2.3.2.3) Contractor Sales Contact
2.3.2.4) Contractor Billing Contact
2.3.2.5) Contractor President / CEO

2.3.3) Coordination by Contractor with Owner Designated Contacts

Contractor shall simultaneously forward copies to the Owner Project Manager of any correspondence between Contractor (or any of its employees or designees) and Owner (or any of its employees or designees).

Contractor shall forward copies of meeting minutes to the Owner Project Manager within one business day following any meeting with Owner (or any of its employees or designees).

Contractor shall submit all required documentation, all test results, all quotations, all matters of dispute, and all questions pertaining to this document in writing via the mailing address of the Owner Project Manager. Contractor shall send electronic copy of same to both the Owner Project Manager and the Owner Technical Contact via email.

Contractor shall submit all technical questions to the Owner Technical Contact via email, with copy to Owner Project Manager.

Contractor shall submit all matters of billing to the mailing address of the Owner Billing Contact, with copy to Owner Project Manager.

Contractor shall submit all certified payroll records to the Owner Certified Payroll Records Contact, and notify Owner Project Manager when these are sent.

Contractor shall submit all questions regarding parking and transportation on Owner premises, all requests for permission to park vehicles on owner premises, and all disputes related to parking/ticketing/towing on Owner premises to the Owner Parking and Transportation Contact

2.4) Quality Assurance and Contractor Qualifications:

Contractor must have and maintain the following qualifications:

2.4.1) Contractor's personnel are trained and experienced in the installation and testing of cabling systems according to all parts of all referenced standards bodies, certification organizations, and laws/codes listed in the "Technical References" section of this document.

2.4.2) Contractor's personnel are trained and experienced in cable support techniques.

2.4.3) Contractor's personnel are trained and experienced in fire stopping methods.

2.4.4) Contractor's on-site personnel must be fully conversant with and capable of the installation of large scale Category 6 / 6A cabling systems for high-speed data and voice, and telecommunications cabling systems to support both analog and digital voice communications.

2.4.5) Contractor's on-site personnel must be trained and certified in the installation of Category 6 / 6A and equivalent cabling systems at the level required to provide the cabling system manufacturer extended performance warranty with a minimum of a 20 year term.

2.4.6) Contractor's on-site supervisory personnel have completed training/testing and are certified in BICSI "Installer 2, Copper (INSTC)".

2.4.7) Contractor's on-site personnel must have completed at least three comparable installations of telecommunications cabling systems supporting analog and digital voice communications within the last year.

2.4.8) Contractor's on-site personnel must be fully conversant with and capable of the installation of large scale Single-mode Fiber Optic (SMF) cabling systems supporting high-speed data and voice, if scope requires SMF installation.

2.4.9) Contractor's on-site personnel must have completed at least three comparable installations of SMF cabling systems supporting 10GBASE-LR Ethernet within the last year.

2.4.10) Contractor's on-site supervisory personnel have completed training/testing, and are certified in BICSI "Installer 2, Optical Fiber (INSTF)".

2.4.11) Contractor's on-site personnel must be trained and certified in installing Corning Single-mode Fiber and equivalent cabling system at the level required to provide the cabling system manufacturer extended performance warranty with a minimum of a 25 year term.

2.4.12) Contractor's on-site personnel must be fully conversant with and capable of the installation of large scale security and surveillance cabling systems supporting analog and digital signals.

2.4.13) Contractor's on-site personnel must have completed at least three comparable installations of cabling systems supporting installation of security/surveillance cable within the last year.

2.4.14) Contractor's on-site personnel must be trained and certified in installing security/surveillance cabling systems supporting analog and digital signals.

2.5) Technical References

The provision and installation of the cable plant is to adhere to the strictest codes, standards, and practices. All products, processes, and standards of work must conform to the current versions of all applicable standards, certification guidelines, and codes as defined by the following organizations and as otherwise cited herein:

American National Standards Institute (ANSI)
American Society for Testing and Materials (ASTM)
Edison Testing Laboratories (ETL)
Building Industry Consulting Service International (BICSI)
Association of Cabling Professionals (ACP)
Electronic Industries Association (EIA)
Federal Communications Commission (FCC)
International Electrotechnical Commission (IEC)
Institute of Electrical and Electronics Engineers (IEEE)
International Standards Organization (ISO)
National Electrical Code (NEC / NFPA 70)
National Electrical Contractors Association (NECA)
National Electrical Manufacturers Association (NEMA)

National Electrical Safety Code (NESC)
National Fire Protection Association (NFPA)
New York State Uniform Fire Prevention and Building Code
Telecommunication Industries Association (TIA)
Underwriters Laboratories (UL)

In the event of a conflict between standards or codes, Contractor shall adhere to the most stringent standard or code.

In the event of a conflict between this Specification and any standard, code, or practice whereby this Specification is the most stringent, Contractor shall adhere to this Specification.

In the event of a conflict between this Specification and any standard, code, or practice whereby this Specification is not the most stringent, Contractor will immediately inform Owner Technical Contact and identify the conflict.

2.6) Approvals and Submittals

Owner reserves the right to deny any request for approval. If an approval request is denied or an approval is not received, then Contractor shall comply with this Specification and Scope of Work.

Any variance from this Specification or from this Scope of Work must be explicitly approved in writing by both the Owner Technical Contact and the Owner Project Manager. An approval from one of either the Owner Technical Contact or Owner Project Manager shall not suffice as approval.

Unless otherwise specified, all submittals must be sent via email as electronic file in Adobe® PDF format. Emails sent to Owner Technical Contact and Owner Project manager must be less than 10 Megabytes in size. No more than six (6) Adobe® PDF files shall be attached to a single email. No more than one (1) product or one (1) method shall be detailed in each Adobe® PDF file.

2.6.1) Materials and Practices

Certain materials and practices are specified herein.

If Contractor wishes to use the specific manufacturer and part number with options specified, then Contractor must submit a single electronic file of a single product cut sheet to the Owner Technical Contact and Owner Project Manager for approval.. Submitted cut sheet shall have specific product part number and specific product options encircled

If specific manufacturer and part number are unspecified, or if Contractor wishes to propose an equivalent component or practice to one that is specified, then a formal request must be submitted to the Owner Technical Contact and Owner Project Manager for approval, and must include electronic copies of all of the following as applies to material or practice:

2.6.1.1) Performance data
2.6.1.2) Cut sheets
2.6.1.3) Shop drawings
2.6.1.4) All supporting documentation.

Proposed alternate component or practice must not invalidate any manufacturer warranty on any installed components, any installed cable plants, or any installed systems.

2.6.2) Change Orders

Requests for Change Orders Proposals may be sent in writing by Owner Project Manager to Contractor at any time following Award and prior to Completion. Request shall describe a proposed Change Order scope in detail and may reference discussions in field.

Contractor shall respond within ten (10) days by sending a Change Order Proposal to Owner Project Manager that shall include a Proposed Change Order Cost Quotation and a Proposed Change Order Schedule Impact Statement.

2.6.2.1) Proposed Change Order Cost Quotation

Contractor shall submit Proposed Change Order Cost Quotation to Owner Project manager which includes detailed line item unit pricing, quantity, and extended pricing for each type of material and labor that would be required to execute the Proposed Change Order.

2.6.2.1.1) Unit Pricing

Unit prices for materials and labor shall be based on calculable values from the first applicable source according to the following ordered list:

2.6.2.1.1.1) Materials and Labor: Contractor's base-bid proposal
2.6.2.1.1.2) Labor: Prevailing wage labor rates

If a required material is not quoted as part of base-bid, then unit price shall be Contractor's gross cost to purchase one unit of that material from supplier at projected quantity, plus 20%

2.6.2.1.2) Quantities

Quantities of materials shall be based on need pertaining to Proposed Change Order, and shall not project greater than 10% surplus, all of which shall be furnished to Owner at end of proposed work.

Quantities of labor units for a required work or trade shall be based on calculable quantities from Contractor's base-bid proposal.

If a required work or trade is not quoted as part of base-bid, then unit based on the first applicable source of the latest editions of the following ordered list of industry-standard guides for estimating:

2.6.2.1.2.1) National Electrical Contractors Association (NECA), Manual of Labor Units
2.6.2.1.2.2) Mechanical Contractors Association of America (MCAA), Labor Estimating Manual
2.6.2.1.2.3) U.S. Army Corps of Engineers, Modification Impact Evaluation Guide
2.6.2.1.2.4) Walker's Building Estimator's Reference Book

2.6.2.2) Proposed Change Order Schedule Impact Statement

Proposed Change Order Schedule Impact Statement shall summarize the greatest potential impact to Schedule as a result of execution of the proposed Change Order by Contractor, and shall propose a new Schedule including an adjustment of all Project Milestones as defined herein, that would be adopted should Owner Project Manager approve of Change Order in writing.

2.6.2.3) Change Order Approval

Approval of Change Order Proposal may take place at sole option of Owner, and must be sent in writing by Owner Project Manager at any time following Award and prior to Completion, but not more than 60 days after Change Order Proposal is received by Owner Project Manager.

A Purchase Order shall accompany any approval of Proposed Change Order. Contractor shall not act on approval of Change Order Proposal unless Purchase Order is received.

2.6.3) Field-Directed Changes

Field-Directed Changes shall be defined as minor changes to the Scope of Work that would result in zero additional cost to Owner or would result in a credit to Owner, and also would have zero impact on Schedule or would result in earlier completion of Schedule, as agreed by both Owner Project Manager and Contractor.

Requests for Field-Directed Change may be sent in writing by Owner Project Manager to Contractor at any time following Award and prior to Completion. Request shall describe Field-Directed Change scope in detail and may reference discussions in field.

Contractor shall respond to Owner Project Manager within two (2) days with a Field-Directed Change Response, which shall either:

2.6.3.1) Confirm that Requested Field-Directed Change is properly classified, and that Field-directed change is agreed by all parties to result in:

2.6.3.1.1) zero cost and schedule impact to Owner, or else

2.6.3.1.2) provide details of credit amount and/or earlier completion of schedule, including a Schedule Impact Statement that demonstrates earlier completion.

2.6.3.2) Dispute that the Requested Field-Directed Change is properly classified as such, and that there are cost and/or schedule implications of executing such a change.

2.6.4) Schedule Impact Statement.

Field-Directed Changes shall not be made by Contractor unless Owner Project Manager directs Contractor in writing to perform a Field-Directed Change. Direction shall be accompanied by detailed description of the Field-Directed change. If Contractor agrees that said Field-Directed Change shall be at zero additional cost or result in a credit to Owner, then Contractor shall respond within

2.6.5) Construction Change Directives

Construction Change Directives shall not be permitted, nor any change that is associated with additional cost in advance of a Purchase Order being issued.

2.7) Notification of Errors, Inquires and Interpretation

It shall be the responsibility of the Contractor to notify owner of any errors in this Specification and to make recommendations to Owner Project Manager and Owner Technical Contact in writing for any additional requirements deemed necessary. If Owner finds the errors significant or a change in the requirements necessary, then Owner will notify Contractor in writing of the change in this Specification. No deviations from this Specification shall be made without approval from Owner Technical Contact and Owner Project Manager.

2.8) Hazards

Contractor must immediately notify Owner Project Manager by telephone, by email, and in writing of any Hazards to any person(s), Hazards to any animal(s), Hazard to the environment, or hazards to any asset(s) of any persons(s), when the Hazard is not managed or manageable by contractor as part of standard means, standard methods, and standard safety procedures. Contractor shall immediately notify Owner Project Manager in writing of any such hazard that exist in this Specification, in the proposed Scope of Work, in any proposed Change Order, or in any Field-Directed Change. Contractor shall avoid the Hazard until written or email reply is received from Owner Project Manager instructing Contractor regarding the identified Hazard.

2.9) Parking and Operation of Vehicles on Campus

Contractor will operate vehicles responsibly under campus rules and regulations and will not park vehicles in unauthorized areas. Illegally parked vehicles will be towed at vehicle owner's expense.

It will be the responsibility of the Contractor to contact the Parking and Transportation Office at (914)251-6177 to make arrangements for temporary visitor parking permits.

Contractor shall not park or operate motor vehicles on grass or other non-paved surfaces, unless explicit written permission is granted by the Parking and Transportation Office.

2.10) Proper Contractor Identification

Employees of Contractor while on site shall wear a uniform shirt. Employees of Contractor shall carry identification badge or identification cards, and shall be instructed to submit same to scrutiny upon request by campus personnel.

2.11) Subcontracts

All requirements that apply to Contractor or Employees of Contractor shall also apply to any Subcontractor that Contractor uses to execute the requirements of this Specification. It is Contractor's sole responsibility to insure that all work is executed according to this Specification, whether performed directly by Contractor, or by Contractor's Subcontractor. Upon request, Contractor must provide a list of all proposed subcontractors along with detailed information regarding their financial and technical abilities.

2.12) Certified payroll records must be submitted by the Contractor to Owner Certified Payroll Records Contact.

Part 3: Materials

3) Materials

The following requirements apply to all materials provided, installed, and/or used by Contractor.

3.1) General

Contractor shall supply all materials, unless otherwise noted.

All materials, equipment, tools and methods shall be of standard manufacture, shall have undergone thorough tests, shall have been proven in actual use, and shall not be custom-designed for this project.

3.2) Category 6 and Category 6A

All Category 6 / 6A cable, jacks, plugs, patch panels, and patch cables must be rated to meet or exceed performance specifications for Category 6 / 6A components as defined in ANSI/TIA-568-C and ISO/IEC 11801 performance requirements for Category 6 / 6A, and shall be ETL verified to Category 6 / 6A, and must be certified by manufacturer at a frequency range of 1Mhz through 600Mhz.

Installed Category 6 / 6A system and components shall support 100BASE-TX Ethernet as per IEEE 802.3u, 1000BASE-T Ethernet as per IEEE 802.3ab, 1000BASE-TX Ethernet as per TIA-854, 2.5GBASE-T and 5GBASE-T Ethernet as per IEEE 802.3bz, 10GBASE-T Ethernet as per IEEE 802.3an, Voice-Over-IP telephony (VOIP) as per TIA-TR41, digital telephony as per TIA-810-B, analog telephony as per TIA 470-C, Power over Ethernet as per IEEE 802.3af, IEEE802.3at, and IEEE802.3bt standards.

Installed materials must form an integrated system and must integrate with existing network. Components and interconnections must match for optimum future performance. All components must be produced by the same manufacturer, or be warranted by an exclusive partnership.

3.2.1) Warranty on Installed Category 6 / 6A Cabling System

Manufacturer warranty on installed Category 6 / 6A Cabling System shall be extended to Owner for a period of not less than 20 years and shall provide immediate remediation or replacement of installed cabling system by manufacturer, if cabling system does not meet the requirements of this Specification, including but not limited to testing parameters, at any point during the warrantee period.

Contractor shall submit manufacturer warranty information on proposed Category 6 / 6A cabling system, along with copies of manufacturer certification credentials for Contractor, with Contractor's bid.

3.2.2) Category 6 / 6A Cable

Category 6 / 6A Cable shall be 24 AWG, 4-pair, with a blue jacket. Plenum-rated cable shall be used where cabling runs through an air-handling space as per NEC/NFPA70. Individual conductors shall be 100% FEP insulated. Cable jacketing shall be lead-free.

Cable shall be independently verified for flammability compliance to NEC article 800 and NFPA 70; CMR ANSI/UL 1666.

Cable shall be dispensed from a plastic reel in a cardboard box packaged by manufacturer.

3.2.2.1) Category 6 Cable

Outer cable jacket diameter shall not exceed 0.25 inches.

Unless otherwise noted, Category 6 cable shall be Unshielded Twisted Pair (UTP).

3.2.2.2) Category 6A Cable

Outer cable jacket diameter shall not exceed 0.285 inches.

Unless otherwise noted, Category 6A cable shall be Foil-shielded Unscreened Twisted Pair (F/UTP).

3.2.2.3) Outside Service Plant Cable (“Category 6A OSP Cable”)

Category 6A OSP Cable shall be 4-pair Foil-shielded Unscreened Twisted Pair (F/UTP).cable. Category 6A OSP Cable shall consist of a core of four balanced twisted pairs surrounded by water-blocking gel, surrounded by a dielectric inner jacketed core, covered by dry water block material , surrounded by aluminum tape shield, surrounded by a sunlight and abrasion resistant black polyethylene outer jacket. OSP Category 6A Cable shall be suitable for direct-buried, underground conduit, and lashed aerial applications.

OSP Category 6A Cable must meet or exceed ANSI/TIA-568-C and ISO/IEC 11801 Class E_A performance requirements for Category 6A, and shall be ETL verified to Category 6A.

3.2.3) Category 6 / 6A Terminations

3.2.3.1) Modular Jacks for Category 6 / 6A Permanent Links

Modular jacks used in Data/Telecommunications Outlets and Patch Panels shall be un-keyed, RJ-45 (8-position – 4-pair) and shall meet EIA/TIA-568 requirements for Category 6 / 6A component performance.

Modular jacks shall fit in a .790" X .582" opening. Modular jacks shall be terminated using PDS 110-style insulation displacement pc board connectors, color-coded for both T568A and T568B wiring. The 110-style connectors shall be capable of terminating 22-24 AWG solid wire. The 110 Contacts shall be paired (with additional space between pairs) to improve crosstalk performance. Each jack shall be provided with a bend-limiting strain relief. The strain relief shall provide a “silo” to limit the bend radius at the point of termination.

Each jack shall have an integral dust cover.

Modular jacks shall be colored orange

3.2.3.2) Modular Plugs for Category 6 / 6A Single-Connector Modified Permanent Links

Where Single-Connector Modified Permanent Links are called for, station/device end shall be terminated in 8-Position 8-Conductor “RJ45” shielded modular plug with dual-pronged blades designed to be crimped onto and create secure contact with the specified/approved solid-conductor cable. Modular plugs for Category 6 / 6A Outside Service Plant (OSP) Cable shall be designed operate as part of an installed Category 6A cabling system.

3.2.3.3) Modular Plugs for Category 6A Outside Service Plant (OSP) Cable

Outside Service Plant Data Cable shall terminate on both ends in 8-Position 8-Conductor “RJ45” shielded modular plugs with dual-pronged blades designed to be crimped onto and create secure contact with the specified/approved solid-conductor cable. Modular plugs for Category 6 / 6A Outside Service Plant (OSP) Cable shall be designed operate as part of an installed Category 6A cabling system.

3.2.4) Category 6 / 6A Station/Device Outlets

3.2.4.1) Standard Faceplates

Standard faceplates shall be non-metallic, constructed of a single molded piece, and shall be of angled type such that the front of installed modular jacks face downward 45-degrees when faceplate is installed with faceplate longest dimension up/down.

Standard faceplates shall be single-gang, and shall accept four modular jacks (“four-port”). Blanks shall be installed in any unused port/space on the faceplate.

Faceplates and blanks shall be colored ivory, unless otherwise specified.

Faceplates shall have insert-type labels capable of accepting and retaining printed non-adhesive paperboard labels of minimum 10-point thickness. Paperboard labels must be of suitable width and height to meet labeling requirements, as defined herein, with label text positioned centered on and parallel to each port to which label text pertains.

A transparent snap-in flexible plastic label cover shall retain the label, and shall have a small hole at side to permit label cover removal.

3.2.4.2) Biscuit Surface-Mount Box (“Biscuit”)

Biscuit shall be constructed of high-impact flame-retardant plenum-rated thermoplastic, and shall be colored white. Biscuits are acceptable only where specified in Scope section for use in outlets above ACT ceilings that are air-handling spaces.

Biscuit shall provide two Category 6A modular jack ports.

Biscuit shall have insert-type label capable of accepting and retaining printed non-adhesive paperboard labels of minimum 10-point thickness. Paperboard labels must be of suitable width and height to meet labeling requirements, as defined herein, with label text positioned centered on and parallel to each port to which label text pertains.

3.2.5) Category 6 / 6A Patch Panels

Category 6 / 6A Patch panels shall be angled, shall be 1.75” high, shall occupy one 19” rack unit (1RU), and shall provide twenty-four (24) individually-replaceable Category 6 / 6A Modular Jacks for termination of cabling. Patch panels shall be colored black.

The front of each patch panel shall be capable of accepting and retaining printed non-adhesive paperboard labels of minimum 10-point thickness. Paperboard labels must be of suitable width and height to meet labeling requirements, as defined herein, with label text positioned centered on and parallel to each port to which label text pertains.

A transparent snap-in flexible plastic label cover shall retain the label, and shall have a small hole at side to permit label cover removal.

3.2.6) Horizontal 19-inch Lacing Bar for Patch Panel Rear Cable Strain Relief

Each installed rack-mounted Category 6 / 6A Patch Panel shall have, projecting to rear of rack from rear of patch panel, a 6-inch deep x 19-inch wide x 0.7-inch high L-shaped horizontal lacing bar installed on rack.

Horizontal 19-inch Lacing Bar for Patch Panel Rear Cable Strain Relief shall have lacing slots of 0.150-inch x 0,9-inch, suitable for attaching hook-and-loop fasteners to secure and reduce strain on solid-conductor cables entering patch panel.

Horizontal 19-inch Lacing Bar for Patch Panel Rear Cable Strain Relief shall be constructed of 18-gauge cold rolled steel, and shall have powder-coat black finish.

Horizontal 19-inch Lacing Bar for Patch Panel Rear Cable Strain Relief shall attached to 19-inch equipment rails in two places (one left rail, one right rail) via equipment mounting screws.

3.2.7) Category 6 Lightning Protectors (for use with OSP Category 6A Cable)

Category 6 Lightning Protectors shall be designed and laboratory-tested for use with 10/100/1000 Base-T Ethernet networks in indoor and outdoor environments between -40 degrees Fahrenheit and +176 degrees Fahrenheit. Category 6 Lightning Protectors shall meet or exceed the GR-1089 Intra-Building surge protection requirements for 10/100/1000 Base-T Ethernet lines.

Category 6 Lightning Protectors shall present two Category 6 8P8C shielded modular jacks, with shield isolated from the safety ground. Category 6 Lightning Protectors modular jacks shall accept 8P8C shielded modular plugs for inline installation in a single permanent link. Category 6 Lightning Protectors shall be compatible with 802.3af Power-over-Ethernet (PoE) devices, and shall support PoE modes A and B as per 802.3af.

Category 6 Lightning Protectors clamping voltage shall be 15 Volts for wire-to-wire, 90 Volts for wire-to-ground, and 90 Volts for shield-to-ground.

Category 6 Lightning Protectors shall have a weatherproof ABS enclosure with gasketed cover and concealed mounting holes. Ground clamp provided outside the Category 6 Lightning Protector enclosure shall accept a 10-gauge ground cable.

Category 6 Lightning Protectors shall be HyperLink AL-CAT6HPJW manufactured by L-Com, or approved equal.

3.2.7.1) Rack-mount Category 6 Lightning Protectors (for use in interior spaces, only)

Rack-mount Category 6 Lightning Protectors are only to be used where specified in interior spaces or whether-protected exterior cabinets.

Rack-mount Category 6 Lightning Protectors shall provide lightning and surge protection for up to 12 lines, with low line to line and line to ground capacitance to minimize distortion of high-speed signals.

Rack-mount Category 6 Lightning Protectors shall provide protection for both common and differential mode surges. The RMSP-CAT6T-12 utilizes gas discharge tubes on each pair for power handling capability.

Rack-mount Category 6 Lightning Protectors shall be compatible with 802.3af/at Power-over-Ethernet (PoE) devices. It supports both PoE mode A and B for power.

Rack-mount Category 6 Lightning Protectors shall provide lightning protection for twelve (12) Category 6 cables via 24 shielded (12 in / 12 out) RJ-45 jacks.

Rack-mount Category 6 Lightning Protectors Category 6 Lightning Protectors shall be “19-inch Rack Mount 12-Port 10/100/1000 Base-T Gas Tube CAT6 Lightning Protector - RJ45 Jacks” manufactured by L-Com, or approved equal.

3.2.8) Category 6 / 6A Patch Cables

Patch Cables shall be gray in color, unless otherwise noted.

Patch cables shall be constructed using 50-micron gold-plated RJ45 (8-position 8-conductor) modular plugs.

Patch Cable shall be constructed using 24 gauge stranded cable.

Patch Cable assemblies shall utilize colored cable and "snagless" cable boots that match the color of the cable.

Each Patch Cable assembly shall be individually certified to Category 6 / 6A performance specification according to TIA-568-C and ISO/IEC 11801, and shall be backed by a 20-year component warranty provided by the manufacturer to Owner.

3.3) Category 3 Telecommunications Feeder/Backbone

All telecommunications feeder cables, patch panels, and punch-down blocks shall be rated Category 3, must comply with or exceed specifications as defined in TIA-568-B, and must be certified by manufacturer at a frequency range of 1Mhz through 16Mhz.

Installed Category 3 telecommunications feeder shall support analog telephony as per TIA 470-C and digital telephony as per TIA-810-B.

Installed materials must form an integrated system and must integrate with existing telecommunications network. Components and interconnections must match for optimum future performance. All components must be produced by the same manufacturer, or be warranted by an exclusive partnership.

3.3.1) Telecommunications Feeder Cable

Telecommunications feeder cable shall be type ARMM, and shall consist of 100-pair of #24 AWG solid conductor cables wrapped individually in expanded polyethylene insulation. Telecommunications feeder cable shall be wrapped in ALVYN sheath-corrugated polymer-coated aluminum shield adhering to a flame-retardant grey PVC jacket. Cable shall be UL/NEC rated. Cable jacketing shall be lead-free.

Color-coding of insulation on individual pairs of conductors shall conform to TIA-568-B and PIC standard color codes for telecommunications backbone cable.

Telecommunications feeder cable shall be ETL verified to Category 3 transmissions requirements as defined in the TIA-568-A standard.

Typical electrical characteristics shall be as follows at 20-degree Celsius:

3.3.1.1) Max DC Resistance of 27.3 Ohms/kft
3.3.1.2) Insulation Resistance of 5000 Megohms-kft
3.3.1.3) Mutual Capacitance of 83 nF/mile at 1 kHz(nom)
3.3.1.4) Nominal Attenuation of 6.9 dB/kft at 772 kHz
3.3.1.5) Characteristics Impedance of 100 Ohms at 1 MHz(nom)

3.3.2) Telecommunications Feeder Patch Panels

Telecommunications Feeder Patch Panels shall be 1.75 inches high, shall occupy one 19” rack units (4RU), and provide 24 RJ45 (8-position – 8-pair) modular jack ports on front of panel, with PDS 110-style insulation displacement connectors on rear of panel that accommodate between 26 and 23 gauge wire. Modular jack ports on front of panel may be configured in groups of between four and six ports.

Telecommunications Feeder Patch Panels shall be fully loaded with RJ-45 jacked, colored black.

Telecommunications Feeder Patch Panel Ports shall be clearly factory-labeled on front of patch panel with consecutive numbers between 1 (at leftmost port) and 24 (at rightmost port).

Telecommunications Feeder Patch Panels shall have integrated lacing lattice at rear of panel to manage wire pairs and permit re-punching IDC for each pair in-place.

Telecommunications Feeder Patch Panels shall be colored black.

Telecommunications Feeder Patch Panels shall be Commscope “Telephone Patch Panel, Category 3, RJ45, 19 in, 25-port, black” part number 1711213-2, or approved equal.

3.3.3) Telecommunications Distribution Frame Punch-Down Block

Cross-connect punch-down blocks for telecommunications distribution frames shall be type 66M split 50-pair blocks. Cross-connect blocks shall provide 6 pins per row, and shall be designed for termination of 22-26 AWG solid or 20-26 AWG stranded conductors. Block shall be molded of flame-retardant thermoplastic with quick-connect clips.

All pairs of the telecommunications feeder cable in the telecommunications distribution frame end shall be terminated on 66M insulation displacement connectors on cross-connect punch-down blocks for telecommunications distribution frames. A sufficient number of cross-connect punch-down blocks for telecommunications distribution frames shall be provided and installed by Contractor such that all pairs of the telecommunications feeder cable provided by Contractor may be terminated.

3.3.4) Telecommunications Gas Protector Panel

Gas Protector Panels shall be CIRCA Telecom (serial #205226, CIRCA 1900A1-100) gas protector panel, or approved equal.

3.3.5) Telecommunications Patch Cables

Telecommunications Patch Cables shall be Category 6 Patch Cables, as defined herein.

Category 6 Patch Cables shall be colored Violet.

3.4) Fiber-Optics

All fiber-optic network cable, jacks, patch panels, and patch cables shall be designed for single-mode optical transmission.

Installed fiber-optic network shall support 1000bLX Ethernet, as per the IEEE 802.3z standard.

Installed materials must form an integrated system and must integrate with existing fiber-optic network. Components and interconnections must match for optimum future performance. All components must be produced by the same manufacturer, or be warranted by an exclusive partnership.

All components of the Fiber-Optic cable plant shall be produced by Corning Cable Systems, or approved equal.

3.4.1) Warranty on Installed Cabling system

Manufacturer warranty on installed Fiber Optic Cabling System shall be extended to Owner **for a period of not less than 25 years** and shall provide immediate remediation or replacement of installed cabling system by manufacturer, if cabling system does not meet the requirements of this Specification, including but not limited to testing parameters, at any point during the warrantee period.

Contractor shall submit manufacturer warranty information on proposed Data/Telecommunications Cabling System, along with copies of manufacturer certification credentials for Contractor and Contractor’s employees, with Contractor’s bid.

3.4.2) Fiber-Optic Cable

All fiber-optic cable shall contain single-mode fibers surrounded by a lead-free flame-retardant outer jacket. Fiber-optic cable shall provide an 8-9 micron core transmission medium with 125 micron cladding, and introduce no more than .4 dB/km of attenuation (nominal).Color of fiber-optic strand cladding and buffer tubes shall conform to TIA-598-C.

Outer jacket of all fiber-optic cable, including armored and non-armored fiber-optic cable, shall be colored yellow.

All fiber optic cable shall be gel-free.

All fiber-optic cable shall be pre-terminated at factory in Multi-Fiber Push-On (MPO) Connectors. Pulling eyes shall be attached by faculty at both ends of cable.

3.4.2.1) Intra-building Single-mode Fiber Optic Cable

All intra-building single-mode fiber optic cable shall contain 24-strands strands of 900 µm tight-buffered fibers. Fibers shall be surrounded by dielectric strength members and a lead-free flame-retardant outer jacket. Outer jacket of all intra-building Single-mode fiber optic cable shall be colored Yellow.

Indoor single-mode fiber optic cable shall be specified as:

3.4.2.1.1) Plenum-rated Armored Single-mode fiber optic cable -- Corning MIC Interlocking Armored Plenum Cable, Corning part number 024E88-33131-A3
3.4.2.1.2) Riser-rated Armored Single-mode fiber optic cable -- Corning MIC Interlocking Armored Riser Cable, Corning part number 024E81-33131-A1
3.4.2.1.3) Plenum-rated (non-armored) Single-mode fiber optic cable – Corning MIC Plenum Cable, Corning part number 024E88-33131-29
3.4.2.1.4) Riser-rated (non-armored) Single-mode fiber optic cable – Corning MIC Riser Cable, Corning part number 024E81-33131-24

3.4.2.2) Inter-building Single-mode Fiber Optic Cable

Unless otherwise noted, all inter-building single-mode fiber optic cable shall contain 24-strands strands of fiber in two 3.0 mm buffer tubes. Buffer tubes shall be surrounded by water-swellable tape, dielectric strength members, and a lead-free UV-resistant flame-retardant outer jacket.

Inter-building single-mode fiber optic cable shall be specified as:

3.4.2.2.1) Plenum-rated Armored inter-building Single-mode fiber optic cable – Corning FREEDM Plenum Loose Tube Cable with Interlocking Armor, part number 024E8P-31131-A3
3.4.2.2.2) Riser-rated Armored inter-building Single-mode fiber optic cable – Corning FREEDM Loose Tube Cable with Interlocking Armor, part number 024EWF-14101-AA1
3.4.2.2.3) Riser-rated (non-armored) inter-building Single-mode fiber optic cable – Corning FREEDM Loose Tube Indoor/Outdoor Cable, part number 024EWF-T4103A20
3.4.2.2.4) Plenum-rated (non-armored) inter-building Single-mode fiber optic cable – Corning FREEDM Loose Tube Indoor/Outdoor Cable, part number

3.4.3) Fiber Optic Grounding

Armored cable shall be grounded.

Armored cable grounding assembly shall be Corning part number FDC-CABLE-GRND (Armored Cable Grounding Kit)

3.4.4) Fiber-Optic Connectors

Fiber-optic connectors shall have Ultra Physical Contact (UPC) polish/finish. Fiber-optic connector ferrules shall be constructed of ceramic.

Fiber-optic connectors shall present no more than 0.2 dB of typical insertion loss and 0.5 dB of maximum insertion loss, as measured by manufacturer at wavelengths of 1310 nm and 1550 nm, FOTP-171.

Fiber optic connectors on patch panels shall be compliant with TIA/EIA 604-2 (“SC”) connectors.

3.4.5) Fiber-Optic Patch Panel

Fiber optic patch panels shall meet requirements of TIA-568-C and TIA606, suitable for loose tube, tight-buffered, and optical fiber ribbon cables. Fiber optic patch panels shall be rack-mountable in standard EIA 19” (48 cm) equipment racks (1.75-in EIA hole spacing). Fiber optic patch panels shall be capable of being rack-mounted with either a 4.5” (11.4 cm) frontal projection to allow entry of fiber-optic patch cable sot front compartment, or flush to rack rails (0” projection). Fiber optic patch panels shall offer multiple locations for jumper egress, and a slide-out drawer for easy connector access.

Fiber-optic patch panel shall provide integrated bend radius limiting, cable anchor, and strand fan-out in rear connector housing. Protection for patch cable connectors, D-rings for patch cable routing, and side egress for patch cables shall be provided on front of housing.

Fiber optic patch panels located in building data/telecommunications closets shall consume two rack spaces (3.5-in high), shall have up to 64 fiber total capacity (SC or ST connectors).

3.4.6) Fiber Optic Cable Management

Fiber optic cable management shall be one rack unit (1.75-in) high.

Fiber optic cable management shall be Corning part number CJP-01U.

3.4.7) Fiber-Optic Patch Cables (Jumpers)

Fiber-optic patch cable assemblies shall be single-mode, 2-fiber jumper cable, and shall provide one duplex SC connector to one duplex un-keyed LC connector.

Fiber-optic patch cable assembly cable shall be engineered to present lowest attenuation at bends up to and including a minimal bend radius of 30mm (1.2 inches).

Fiber-optic patch cable assembly cable outer jacket shall be yellow in color, and shall allow separation of individual fibers and duplex connectors in field to allow conversion to two separate 1-fiber jumpers. Each separable 1-fiber cable shall be minimum of 2mm in diameter.

SC and LC connectors shall allow coupling and decoupling in duplex or single connector configuration.

LC connector duplex clip shall allow pairs to be swapped in the field such that cable may be field-configurable as either a straight-through or crossover cable.

Connector ferrules shall be constructed of ceramic. Connectors shall be factory-installed, shall have Ultra Physical Contact (UPC) polish/finish, and shall present no more than 0.15 dB of typical insertion loss and 0.4 dB of maximum insertion loss, as measured by manufacturer at wavelengths of 1310 nm and 1550 nm.

Fiber-optic patch cable assemblies shall be factory-built and factory-tested to produce no more than 1 dB attenuation at wavelengths of 1310 nm and 1550 nm.

Fiber-optic patch cable assemblies shall be Corning Cable Systems part number 0472-02-R5120-002-M.

3.4.8) Fiber-Optic Splice Enclosures

Fiber-Optic Splice Enclosures shall be Corning Cable Systems part number SCF-6C28-01-144 or approved equal.

Fiber splice trays shall by type 2S trays, and shall permit for 24 RTF fusion splices.

Fiber-optic splice trays shall be Corning Cable Systems part number M67-092.

3.5) Audio/Video

3.5.1) All Category 6 / 6A cable and components used to interconnect Audio/Video components shall meet all requirements for Category 6 / 6A cable and components, defined herein.

3.5.2) All fiber optic cable and components used to interconnect Audio/Video components shall meet all requirements for Category 6 / 6A cable and components, defined herein.

3.6) Security/Surveillance

3.6.1) All Category 6 / 6A cable and components used to interconnect Security/Surveillance components shall meet all requirements for Category 6 / 6A cable and components, defined herein.

3.6.2) All fiber optic cable and components used to interconnect Security/Surveillance components shall meet all requirements for Category 6 / 6A cable and components, defined herein.

3.6.3) Security/Surveillance Cable

3.6.3.1) Power Cable

Power cable used for surveillance network shall be two conductor 18 AWG twisted pair, with stranded bare copper conductors, encased in a black jacket.

3.7) Pathways and Spaces

3.7.1) Termination Devices

3.7.1.1) Metallic Recessed-Mount Device Boxes

Metallic Recessed-Mount Device Boxes shall be constructed of 0.0625-inch-thick galvanized steel, and shall be “four-square” extra-deep type, with minimum dimensions of 3.5-inch deep x 4-inch wide x 4-inch high.

Metallic Recessed-Mount Device Boxes shall have eight (8) 3/4-inch side Knockouts.

Metallic Recessed-Mount Device boxes above symsum-board ceiling shall be supported by am 8-inch max depth adjustable height box hanger. Box hanger shall be Garvin BHT481A, or approved equal.

3.7.1.2) Metallic Surface-Mount Device Boxes

Metallic Surface-Mount Device Boxes shall be constructed of 0.0625-inch-thick galvanized steel, and shall be “four-square” extra-deep type, with minimum dimensions of 3.5-inch deep x 4-inch wide x 4-inch high.

Metallic Surface-Mount Device Boxes shall have eight (8) 3/4-inch side Knockouts.

3.7.1.3) Non-Metallic Surface-Mount Device Boxes

Non-Metallic Surface-mount device boxes shall be constructed entirely of PVC, and shall be ivory in color.

NM surface-mount device boxes shall be 2 7/8” inches deep, and shall be single-gang, 3 inches wide by, 4 7/8” high.

NM surface mount boxes shall be of same manufacturer and compatible with approved raceway, and shall have knockouts/twist-outs for selected raceway model.

NM surface-mount device boxes shall be designed to be secured to wall mechanically using screws or bolts.

3.7.2) Low Voltage Faceplate Mounting Brackets

Low voltage mounting brackets shall be constructed of minimum 0.0303 inch thick galvanized steel, and shall be mounted to wall using a minimum of two fold-back tabs as well as drywall screws.

Unless otherwise noted, low voltage mounting brackets shall be single-gang.

Unless otherwise noted, low voltage mounting brackets shall be used for retrofit applications, only.

Low voltage mounting brackets must allow faceplate to be mounted flush, with no greater than a 1/16” gap between faceplate and wall.

3.7.3) Floor Boxes (In-Floor Device Box)

In-floor device boxes shall be constructed of galvanized steel, and shall be installed with parts to permit concrete pour around box. Box

In-floor device box shall have mechanically-fastened self-sealing flip-open covers installed flush with floor that prevent water and dust ingress when covers are closed. Cover shall be able to be secured by turning integrated screw when not in use.

Unless otherwise noted, in-floor device boxes shall offer two divided compartments per NEC requirements permitting both low voltage communications cabling and 120-Volt electrical power to be terminated in the same device box.

Floor box shall permit installation of at least two (2) standard single-gang faceplates for communications, and at least two (2) single-gang faceplates for electrical power. Single-gang faceplates when installed must face up at no less than 45 degree angle. At least three inches of space must be provide between center of single-gang faceplate cover to permit patch cables and power cords to be connected.

Standard Category 6 / 6A faceplates must be able to be used in singe-gang slots, with insert labels visible while cover is on.

3.7.4) Poke-Throughs

Poke-throughs shall fit into nominal 4” cored hole, and shall be fire-rated for four hours when installed in compatible unprotected reinforced concrete floors or fire-rated for three hours when installed in compatible floors employing steel floor units with concrete top floors. An adjustable fire barrier shall be integral to the poke-through that may accommodate floors between 2 ¼ inches to 7 inches in thickness. Poke-throughs shall be suitable for new or retrofit installations, shall be suitable for use in air handling spaces, and shall be appropriate for installation on carpeted or tiled floors.

3.7.4.1) Recessed Poke-throughs shall provide minimum four (4) Category 6 / 6A modular jacks, and minimum two (2) NEMA 5-20R electrical power receptacles fed by two separate 20 Amp 125V power circuits.

3.7.4.2) Furniture Feed Poke-throughs shall provide a minimum 1-1/2” opening for low voltage Categeory 6 / 6A cable conduits, and minimum 3/4” opening for electrical power cable conduits. Both low voltage and power openings shall allow watertight connection using standard Liquidtight Flexible Metal Conduit (LFMC) adapters, and shall be furnished with threaded/gasketed blank plugs of same finish as cover that prevent scrub water infiltration and provide a flush finish of plate should furniture feed conduit be disconnected in the future.

Poke-through cover shall be gasketed to prevent scrub water infiltration around perimeter of poke through, and shall permit replacement of gasketed cover with a furniture feed cover

3.7.5)

Poke-throughs shall provide flip-up gasketed covers over each data/communications and power receptacle, to exclude scrub-water and dirt/debris when closed. Poke-through receptacles shall be positioned face-up atop a flange that shall raise the receptacles a minimum of 0.5 inches in height, further discouraging scrub-water infiltration even when covers are opened.

Poke-throughs shall exceed UL514A and UL514C testing standards, and UL scrub water exclusion requirements.

3.7.6) Ladder Cable Tray

All cable trays installed in data/telecommunications closets will be ladder-style cable tray. Unless otherwise noted, ladder cable tray shall be 18 inches wide, and powder-coat painted black.

Ladder cable tray shall have stringers and cross members that are 1.5 inches wide by 0.375 inches high made from tubular steel with 0.065 wall thickness. Cross members shall be welded to stringer 4-1/2 inches from end of a single tray section, and thereafter at 9 inch intervals in that section.

When properly installed, stringers will be positioned under cross members, creating a flat load area on top of ladder cable tray.

Maximum load shall be at least 132 pounds per foot when manufacturer-approved supports for ladder cable tray are installed at 5-foot intervals.

Ladder cable tray shall be installed according to manufacturer specification, using proper radius fittings and fasteners prescribed by manufacturer.

Ladder cable tray shall be grounded per NEC and manufacturer standards and bonded to the equipment rack in data/telecommunications closets,

3.7.7) Basket Cable Tray (“Basket Tray”)

Unless otherwise noted, all intra-building cable trays will be 8”-wide welded wire mesh basket cable tray with a 2” usable load depth. Finish of basket tray shall be pre-galvanized zinc finish, applied to steel wire prior to fabrication, and meeting the minimum properties of ASTM A 641.

Basket tray shall have T-weld on top rail in order to avoid sharp surfaces or protrusions on tray surface. Wire Diameter on all mesh sections of basket tray must be a minimum of 0.197 inch.

Basket tray manufacturer must have a demonstrated history of production and distribution of product offering for a minimum period of 3 years in the US.

Basket cable tray shall be installed as per manufacturer’s specification. All fittings shall be field-formed, from straight sections, in accordance with manufacturer’s instructions.

Basket tray shall be classified by UL as an Equipment Ground Conductor (ECG) when spliced as recommended. All splicing assemblies shall likewise be UL approved as ECG.

3.7.8) Conduit

All conduits to be installed by Contractor, unless otherwise specified, shall be Electrical Metallic Tubing.

3.7.8.1) Electrical Metallic Tubing

Electrical Metallic Tubing (EMT) must be ANSI C80.3 galvanized conduit.

EMT fittings and conduit bodies installed in interior spaces must be NEMA FB 1 steel setscrew type.

EMT fittings, conduit bodies, and junction boxes installed in exterior spaces must be weatherproof compression type.

Conduit system bushing and connectors must have nylon insulated throats.

3.7.9) Raceway

Raceway and fittings shall be constructed entirely of PVC, and shall be colored Ivory. minimum 8’ lengths. Raceway shall be designed to be secured to walls mechanically using screws or bolts. Raceway product series must include the following finishing fittings:

3.7.9.1) cover clip / union
3.7.9.2) internal 90-degree bend
3.7.9.3) external 90-degree bend
3.7.9.4) flat 90-degree bend
3.7.9.5) end-cap

Fittings shall have a minimum of 1.3 inches interior bend radius, and shall be suitable to maintain rating of selected Category 6 / 6A cable.

3.8) Innerduct

All innerduct shall be constructed of corrugated High Density Polyethylene (HDPE) and shall be colored orange.

3.9) Pull Tape

Pull tape shall be composed of longitudinal aramid strands tied together with a 90-degre cross-weave of polyester strands. Pull cord shall have a minimum tensile strength of 1250 pounds, and shall maintain less than 4% tensile elongation at yield.

Pull tape shall have lubrication coating applied at factory, and shall have a coefficient of less than 0.12 (twelve hundredths).

Pull tape shall have footage marked clearly on tape by manufacturer.

Pull tape shall meet or exceed pull line requirement as defined in Bellcore GR-356-CORE "Generic Requirements for Optical Cable Innerduct and Accessories".

3.10) Pull Cord

Pull cord shall be composed of continuous polyethylene fibers and shall have a tensile strength of at least 200 pounds.

3.11) Cable Fasteners

Velcro brand hook-and-loop fasteners, or equivalent shall be used to secure cables. Contractor shall not use nylon or plastic zip strip, tie wrap, cable tie, (etc.) or similar fasteners on cables during construction and installation of the Data/Telecommunications Cabling System.

3.12) Equipment Cabinets (“Cabinets”)

Equipment cabinets shall be four-post free-standing EIA 19” cabinets, specifically designed for high-density cabling system applications. Cabinets shall include steel side panels each end of a series of bayed cabinets. Each cabinet shall include steel locking doors on front and rear. Installed cabinets shall provide NEMA 12 rating of protection against dust, falling dirt, and dripping non-corrosive liquids.

Cabinets shall be rated IP 51, and classified UL 50 Type 1, UL 50 Type 2, and UL 50 Type 12. Cabinets shall be certified by Underwriters Laboratories to be in compliance with UL 50 (Standard for Safety for Enclosures for Electrical Equipment), and to maintain integrity of a UL Type 12 enclosure.

Cabinets shall include integrated plinths (base) to raise bottom of cabinet a minimum of 4” from floor when installed. Plinths shall have side, front, and rear covers.

Cabinets shall be constructed of steel and shall provide a minimum of 2500 pound static load capacity when properly installed. Cabinet mounting rails/panels shall be constructed of 12 gauge zinc-plated steel. Cabinet frame, roof, base, and sidewalls shall be constructed of 16 gauge steel. Cabinet doors shall be constructed of 14 gauge steel.

Cabinet rails depth shall be fully adjustable. All rack mounting rails shall be factory machine-tapped with 10/32” factory-tapped holes in EIA-310-D Universal pattern.

Cabinet exterior shall be dip coat primed, and powder-painted RAL 7035 lightgray at factory.

Cabinet door handles shall be tamper-proof with integrated locks, keyed alike.

Unless otherwise specified, cabinets shall be 82 inches high, 28 inches wide, and 31.5” deep, and provide 42 rack units (RU) of equipment mounting space.

If integrated cabinet system air conditioner is specified, then air conditioner shall be manufactured by the same manufacturer as the cabinet, and shall be compatible with cabinet. Cabinet shall maintain its NEMA 12 rating when the air conditioner is installed. Air conditioner shall accept 230V input, and provide a minimum of 3500 BTU of continuous cooling in sustained ambient temperatures of 55 degrees Celsius.

Cabinets shall be Hoffman base model number PDCP2078GAC or approved equivalent. Solid doors shall be Hoffman part number PDS207G.

Integrated cabinet system air conditioner shall be Hoffman part number CR290426G002, or approved equivalent.

One baying kit shall be supplied with each cabinet.

Additional Hoffman components are required in order to meet this Specification.

Contractor shall coordinate with Hoffman product specialist and Owner Technical Contact to ensure proper cabinet configuration and order. Contractor shall submit Bill of Materials to Owner Technical Contact and Owner Project Manager for approval prior to order placement.

3.12.1) Mounting Hardware for Cabinets

Contractor shall furnish a quantity of one hundred (100) compatible equipment mounting bolts for each cabinet supplied.

3.12.2) Power Distribution Units for Cabinets

Contractor shall install two (2) Power Distribution Units (PDUs) per each cabinet supplied by Contractor.

PDUs for cabinets shall each have a single 30 amp 125 volt input via a NEMA L5-30M (male) plug, and shall distribute power to a total of twenty-four (24) NEMA 5-15/20 (“T-slot”) female receptacle outputs.

PDUs shall each be between 42” and 49” in height, between 2” and 3” in width, and less than 2.5” inches in depth. Input power cable shall be 7’ long.

Two 20 Amp circuit breakers shall be integrated into PDU chassis, and shall each be wired to twelve (12) NEMA 5-15/20 outputs.

3.12.3) Vertical Cable Management Panels for Cabinets

One vertical slotted duct cable management panel shall be provided and installed by Contractor on each post of each cabinet provided by Contractor (four per cabinet).

Vertical slotted duct cable management provided with cabinet shall be molded out of plastic and shall incorporate bend radius control throughout the fingers, pass-through holes, and transitions between horizontal and vertical pathways. Integral cable retainers shall be molded on the end of each finger. Four snap-on adjustable cable retainers, manufactured specifically to fit the selected model of cable management, shall be attached to duct fingers to provide additional retention of cables within channel.

Vertical slotted duct cable management provided with cabinet shall be double-sided. Front and rear dual-hinged cover shall open minimum of 110-degrees in the left or right position. Front duct shall be 83” high X 6” deep X 4.9” wide. Rear duct shall be 83” high X 6” deep X 4.9” wide.

Vertical slotted duct cable management provided with cabinets shall be colored black.

3.13) Wall-Mounted Cabinets (“Wall-Mounted Cabinets”)

Wall-Mounted Cabinets shall be constructed of 16 gauge steel with black powder-coated finish. Wall-Mounted Cabinets shall have four equipment mounting rails – two in front and two in rear. Wall-Mounted Cabinet equipment mounting rails shall be constructed of 11 gauge steel with black powder-coated finish, shall be 19 inches apart with fully adjustable depth position, and shall provide 26 rack units of usable rack space. All rack mounting rails shall be factory machine-tapped with #12/24 factory-tapped holes in EIA-310-D Universal pattern. Wall-Mounted Cabinets shall have solid front door. Wall-Mounted Cabinet shall have a rear hinged section with pre-drilled/cut keyholes slots that permits mounting to wall, and allows full access to rear of cabinet when mounted. Rear section of cabinet shall have minimum three (3) 3-inch diameter and eight (8) ¾-inch diameter conduit entry knockouts on top and bottom panels. Wall-Mounted Cabinet side panels shall be vented via ventilation slots/louvers. Wall-Mounted Cabinet top shall have 250 CFM exhaust fan. Wall-Mounted Cabinet dimensions shall be 48 inches high, by 21 inches wide, by 26 inches deep.

Wall-Mounted Cabinet shall be Hubbell base part number HSQ48S36.

Wall-Mounted Cabinet shall include an installed top-mounted Fan Kit With Tray containing two (2) 57 CFM fans, Hubbell part number HWKF120..

Wall-Mounted Cabinet shall include an installed 1-RU Power Strip (PDU) with casing constructed of steel, with one (1) NEMA 5-15P input on six-foot stranded cord, and ten (10) rear-facing NEMA 5-15R outlets. Power Strip (PDU) shall be Hubbell part number HPWPWR.

Wall-Mounted Cabinet rear rails shall be Hubbell part number WMC48RAILS or approved equal, installed.

3.13.1) Mounting Hardware for Wall-Mounted Cabinets

Contractor shall furnish a quantity of one hundred (100) compatible #12/24 equipment mounting bolts for each cabinet supplied.

3.14) Open Equipment Racks (“Racks”, “Open Racks”)

Open Equipment Racks shall be two-post free-standing EIA 19” wide racks, specifically designed for high-density cabling system applications. Racks shall be constructed of steel and shall provide a minimum of 1500 pound static load capacity. Rack shall be colored black with powder-painted at factory.

Rack posts shall be factory machine-tapped on front and rear with #12/24 factory-tapped holes in EIA-310-D Universal pattern.

Rack posts shall contain built-in cable routing channels with hand-hole access openings on sides. The depth of the built-in cable routing channels shall be 16.5”. Rack shall provide open access to cable routing channels from top, bottom, and inside of rack. The cable routing channel outside walls shall provide built-in cable tie points for affixing ¾”-wide hook-and-loop fasteners directly to sidewalls while dressing cable.

Racks shall have integrated rungs on top of rack behind rack face to permit support and routing of cables to patch panel rear. Integrated rungs shall be of sufficient radius to maintain proper bend radius of cable.

Racks shall have integrated top trough with built-in waterfall in front of posts to provide bend radius control and efficient routing for patch cables.

Unless otherwise specified, racks shall be seven feet high (7’ H), and provide 45 rack units (45 RU) of equipment mounting space.

Seven-foot-high Open Racks shall be Legrand part number OR-MM6716, or approved equivalent.

Eight-foot-high Open Racks shall be Legrand part number OR-MM6816, or approved equivalent.

3.14.1) Mounting Hardware for Open Racks

Contractor shall furnish a quantity of one hundred (100) compatible #12/24 bolts for each rack supplied.

3.14.2) Power Distribution Units for Open Racks

Contractor shall install two (2) Power Distribution Units (PDUs) on each Open Rack provided and/or installed by Contractor.

PDUs for Open Racks shall each have a single 30 amp 125 volt input via a NEMA L5-30M (male) plug, and shall distribute power to a total of twenty-four (24) NEMA 5-15/20 (“T-slot”) female receptacle outputs.

Two 20 Amp circuit breakers shall be integrated into PDU chassis, and shall each be wired to twelve (12) NEMA 5-15/20 outputs.

PDUs for open racks shall each be between 42” and 49” in height, between 2” and 3” in width, and less than 2.5” inches in depth. Input power cable shall be 7’ long.

PDUs for open racks shall be mounted vertically on rear of Open Rack, and secured to factory-tapped holes on rear face of Open Rack using PDU-manufacturer-supplied brackets.

PDU must have mounting brackets that permit mounting PDU to pre-tapped holes in the Open Rack as described herein. Adjustable mounting brackets are acceptable if brackets securely fasten PDU to rack. Tapping of rear face of Open Rack shall not be permitted. Use of pre-tapped 19-inch EIA-pattern equipment mounting holes to mount PDU shall not be permitted.

One PDU shall be installed on each (left and right) side of rear face of Open Rack, four inches away from (clear) of EIA Universal equipment mounting holes of Open Rack.

Each PDUs for Open Racks shall be mounted such that output receptacles face laterally inward, toward nearest of the two rear 19-inch equipment-mounting rails of Open Rack. PDU shall not block ability to mount or remove equipment on rear rails when installed and fully-populated with 3-inch deep plugs in each output receptacle of PDU.

3.14.3) Vertical Cable Management Panels for Open Racks

One vertical cable management panels shall be provided and installed by Contractor on each post of each rack provided by Contractor.

Vertical cable management provided with racks shall be colored black, with a solid black front cover with hinge on both sides to permit opening of panel from right or left without removal of panel. Vertical cable management provided with racks shall be manufactured by same manufacturer of rack to fit selected rack. Vertical cable management provided with racks shall include snap-on bend-radius-limiting cable management spools and bend-limiting clips. Vertical cable management provided with racks shall provide a 6-inch-wide channel between racks for front and back routing of equipment cables and patch cords.

Seven-foot-high vertical cable management panels for seven-foot-high open racks shall be Ortronics part number OR-MM6VMD710 or approved equivalent.

Eight -foot-high vertical cable management panels for eight-root-high open racks shall be Ortronics part number OR-MM6VMD810 or approved equivalent.

3.15) Horizontal Cable Management Panels

One horizontal slotted duct cable management panel shall be supplied and installed per each 24-port Category 6 patch panel supplied.

Horizontal slotted duct cable management panel shall be molded out of plastic and shall incorporate bend radius control throughout the fingers, pass-through holes, and transitions between horizontal and vertical pathways. Integral cable retainers shall be molded on the end of each finger. Four snap-on adjustable cable retainers shall be attached to duct fingers to provide additional retention of cables within channel. Snap-on adjustable cable retainers must be manufactured specifically to fit the selected model of slotted duct cable management panel.

Horizontal slotted duct cable management panel shall be colored black.

Horizontal slotted duct cable management panel shall be double-sided. Front dual-hinged cover shall open 180-degrees in the up or down position. Rear cover shall snap on. Front duct shall be 3.5” high X 3” deep. Rear duct shall be 2” high X 5” deep. Horizontal slotted duct cable management panels shall mount to any standard EIA 19” wide rack.Horizontal slotted duct cable management panel shall be PANDUIT part number NCMH2, or approved equal.

3.16) Labels

All label text shall conform to the Cable Installation Labeling Convention, defined herein.

All labels shall meet the legibility requirements of UL 969, and shall be preprinted using a mechanical means of printing (e.g., laser printer) using the label content of an approved Circuit Endpoint Table Spreadsheet submittal.

3.16.1) Data/telecommunications Outlet Labels

Data/telecommunications faceplates shall be labeled using compatible non-adhesive labels. A transparent snap-in flexible plastic label cover shall retain the label, and shall provide a small hole at side to permit label cover removal.

Data/telecommunications outlets and data/telecommunications outlet ports shall be labeled according to the Cable Installation Labeling Convention, defined herein.

3.16.2) Labels for Patch Panels (all types)

Patch Panels shall be labeled using compatible non-adhesive labels. A transparent snap-in flexible plastic label cover shall retain the label, and shall provide a small hole at side to permit label cover removal

Patch panels and patch panel ports shall be labeled according to the Cable Installation Labeling Convention, defined herein, and shall meet the legibility requirements of UL 969. Font shall be Bold 8-point Courier (fixed width), and label content shall be left-justified.

3.16.3) Cable Marking Labels

Cable marking labels shall be composed of vinyl substrate with a white printing area and a clear “tail” that self laminates the printed area when wrapped around the cable.

Cable marking labels shall meet the legibility, defacement, exposure, and adhesion requirements of UL 969, and shall be preprinted using a mechanical means of printing (e.g., laser printer).

If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.

Cables shall be labeled on both ends according to the Cable Installation Labeling Convention, defined herein.

3.16.4) Fiber-Optic Cable Warning Labels

Fiber-optic cable warning labels shall alert to the presence of fiber-optic cable within innerduct and conduit.

Fiber-optic cable warning labels shall be colored yellow, and shall clearly state in black print applied by manufacturer: “WARNING” and “FIBER OPTIC CABLE”.

Fiber-optic cable warning labels shall also advise reader in clearly legible print to “CONTACT: CTS NETOPS AT (914)251-6465” for information.

Fiber-optic cable warning labels shall be manufactured to attach directly to innerduct, conduit, and fiber-optic cable via mechanical means, rather than adhesive.

3.17) Plywood Backboard

Plywood used for backboard in data/telecommunications closets shall be 3/4” thick, type A/C, and must be stamped clearly on the “good” finished side (the “A” side) by manufacturer showing that it has been treated with fire-retardant chemical, and meets Class A requirements for NFPA Life Safety Code (NFPA 101). Plywood shall be entirely unpainted. At least one fire-retardant treatment stamp must be clearly visible on plywood at all times, regardless of what is mounted on the backboard.

Whole 4’ x 8’ sections of plywood shall be cut to fit the specified area of backboard. Scrap or remnant wood is not acceptable. Plywood must be free of dirt and dust.

Plywood shall be cut and mounted such that specified size and area of backboard is covered continuously, with as few joints and as few cuts as possible.

3.17.1) Steel Strut Used as Standoff for Plywood Backboard

Steel strut Used as Standoff for Plywood Backboard shall be 1-5/8 inch wide by 2-7/16″ deep, and shall be constructed of 12 Gage, low-carbon cold formed steel.

Steel strut used as standoff for Plywood Backboard shall have mounting holes drilled every 1-7/8” inch on center at its face.

3.18) Electrical Grounding Busbar for Data/Telecommunications Closets

Contractor shall supply and install one UL-listed electrical grounding busbar for each plywood backboard assembly installed by Contractor in data/telecommunications closets, to be used as the Telecommunications Main Grounding Busbar (TMGB) in data/telecommunications located closest to entrance facility, and as Telecommunications Grounding Busbar (TBB) in all other closets as per TIA/EIA J-STD-607-A.

Grounding busbars for data/telecommunications closets shall be 0.25” deep x 4" high x 12" wide copper grounding busbar with a minimum of eighteen (18) 0.437” holes at a minimum of 1” separation.

Grounding busbars for data/telecommunications closets shall be insulated from each of its supports by a minimum of two inches (2”) of UL standoff insulators.

Grounding busbars for data/telecommunications closets shall be mounted at bottom of plywood backboard via two stainless steel mounting brackets, and four stainless steel assembly bolts and lock washer.

Grounding busbars for data/telecommunications closets shall be suitable for indoor or outdoor installations.

Electrical Grounding Busbar shall be Storm Copper SCGB-5KT Ground Bar Kit, or approved equal.

3.19) Firestopping

Use only Firestopping products that have been tested for specific fire resistance rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.

Firestopping products shall form a seal around cables that shall remain soft and pliable to allow removal, repair, and the addition of cables (“re-enterability”) without power tools, and without any danger of damaging existing cable traversing the penetration

Firestoppping products shall be UL-Listed.

3.19.1) Firestopping

Materials used for Firestopping shall remain soft and pliable to allow removal, repair, and the addition of cables (“reenterability”) without power tools, and without any danger of damaging existing cable traversing the penetration.

Firestopping Materials shall not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction.

Firestopping Putty/Caulk/ Foam shall be colored red.

3.19.2) Fire Rated Cable Pathway Devices (Firestop Assemblies)

Fire Rated Cable Pathway Devices shall be comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill while retaining all Firestopping properties.

Fire rated pathway devices shall:

3.23.2.1.1) Meet the hourly rating of the floor or wall penetrated.
3.23.2.1.2) Permit the allowable cable load to range from 0% to 100% visual fill while retaining intumescent/firestopping properties, thereby eliminating the need to calculate allowable fill ratios.
3.23.2.1.3) Permit multiple devices to be ganged together to increase overall cable capacity.
3.23.2.1.4) Allow for retrofit to install around existing cables.
3.23.2.1.5) Include an optional means to lengthen the device to facilitate installation in thicker barriers without degrading fire or smoke sealing properties or inhibiting ability of device to permit cable moves, add-ons, or changes.
3.23.2.1.6) Not require any additional action on the part of the installer to open or close the pathway device or activate the internal smoke and fire seal, such as, but not limited to:
3.23.2.1.6.1) Opening, closing, or adjustment of doors.
3.23.2.1.6.2) Twisting an inner liner.
3.23.2.1.6.3) Removal or replacement of any material such as, but not limited to, sealant, caulk, putty, pillows, bags, foam plugs, foam blocks, or any other material.

Fire Rated Cable Pathways shall be Specified Technologies Inc. (STI) EZ-PATH™ Fire Rated Pathway or approved equal.

3.19.3) Firestopping for Data/Telecommunications Cabinet Penetrations

Firestopping used on data/telecommunications cabinet penetrations shall provide a fire- and smoke-proof seal to and from space within cabinet.

3.20) Wireless Access Point Mounting Brackets

3.20.1) Suspended-Ceiling-Mount Wireless Access Point Mounting Bracket

Suspended-Ceiling-Mount WAP Bracket shall be Cisco AIR-AP-T-RAIL-R, Part Number 700-19209-04. Suspended-Ceiling-Mount Wireless Access Point Bracket shall be provided by Purchase College.

3.20.2) Indoor Wall-Mount Wireless Access Point Mounting Bracket

Indoor Wall-Mount Wireless Access Point Mounting Bracket shall be constructed of 18 gauge steel, and be constructed sturdily with a hostile environment in mind. Door concealing faceplate must lock, and all Wall-Mount WAP Mounting Brackets must be keyed alike. Two keys shall be furnished for each Wall-Mount WAP Mounting Bracket provided. Surface of WAP Mounting Bracket shall be finished with textured white powder coat.

Indoor Wall-Mount Wireless Access Point Enclosures shall be Oberon Wireless model 1012-00 or approved equal.

Part 4: Execution

4) Execution

4.1) Quality of Work

All work shall be performed to the highest industry standards. All equipment and materials are be installed in a neat and secure manner in accordance with applicable industry technical standards, local code standards, and product manufacturer's installation instructions and standards.

4.2) Pre-Bid and Pre-Installation Surveys

Prior to placing any cabinet, rack, wireless access point enclosure, conduit, cable tray, raceway, feeder, or cable, the Contractor shall survey the site to see that job conditions do not impose any obstructions that would interfere with the safe and satisfactory placement of the cables or equipment. Necessary changes to the plans may be determined by Contractor’s site survey, and such changes require written approval by Owner Project Manager.

Building plans and documentation are not guaranteed to be entirely accurate or to scale, and are provided for informational purposes only. Contractor must verify all measurements in the field.

Unless otherwise noted, Contractor may freely access public areas of campus during normal hours of operation in order to verify measurements and existing conditions.

Contractor is urged to perform a site visit and verify measurements and existing conditions prior to placing a bid in respond to any request for quote or request for proposal.

4.3) Access and Physical Security

Contractor may require access to locked doors or alarmed areas. Contractor shall coordinate access with Owner Project Manager.

If a security alarm is tripped, then Contractor must immediately notify the University Police Department at (914)251-6900.

Contractor shall comply with all of Owner's policies regarding access to non-public areas.

Contractor may be provided with a chaperone by Owner while working in residence facilities, museum, art galleries, and other restricted areas of the campus.

4.4) Coordination with Other Trades

In order to conform to the overall project event schedule, Contractor shall survey the work areas regularly, and coordinate work with other applicable trades and with the Owner Project Manager.

4.5) Damage or Loss

During installation, and prior to final acceptance, the Contractor shall protect finished and unfinished work against damage and loss. In the event of such damage or loss, the Contractor shall replace or repair such work at no additional cost to Owner. As cable is installed, care must be taken to avoid nicks, kinks or other damage to the cable.

4.6) Existing Cables and Equipment

Contractor shall perform work without disturbing existing cables and equipment. If Contractor must disturb existing cables in order to perform work, then Contractor must obtain prior written permission to do so from Owner.

4.7) Clean-up

Contractor is required to clean up work areas of debris and dust generated by Contractor, as specified herein.

4.7.1) End of day

Contractor shall broom-clean all work areas of job site prior to leaving job site the end of each workday. Contractor shall restore suspended-ceilings in occupied areas to their former condition by the end of each workday. If suspended-ceiling tiles are damaged or broken, then Contractor shall replace tiles.

4.7.2) End of project

Following the completion of construction in an area, Contractor shall vacuum-clean and wipe-down all dust and debris generated by the work.

4.7.3) Data/Communications Closets and Cabinets

4.7.3.1) New Data/Telecommunications Closets and Cabinets

New Data/Telecommunications Closets and Cabinets shall be delivered to college in clean condition with all surfaces dust-free and debris-free.

4.7.3.2) Existing Data/Telecommunications Closets and Cabinets

Existing Data/Telecommunications Closets and Cabinets shall be cleaned by Contractor with HEPA-Filter dry Vacuum prior to commencing work in closet , and shall be maintained as dust-free and debris-free for duration of project.

Tools, cloths, boots, and ladders shall be cleaned prior to entering any Data/Telecommunications Closet or Cabinet.

Sticky mat and temporary door sweep shall be required at Data/Telecommunications Closet to prevent dust from entering.

4.8) Regular Meeting with Owner Project Manager

Owner Project Manager and Contractor Project Manager shall meet weekly, or more frequently as determined by Owner Project Manager. Owner Technical Contact and/or Contractor Field Contact, or any other party that Owner or Contractor deem necessary may be present.

4.9) Splices

All cables shall be “home run” between patch panel and termination point.

No intermediate splice points are permitted for cables of any type.

Splicing of any cables of any type is prohibited, except where fiber-optic fusion splices or Category 3 telephone splices are specified.

4.10) Technical Requirements

4.10.1) Data/Telecommunications Cabling System

Installed Category 6 / 6A system and components shall support 100BASE-TX Ethernet as per IEEE 802.3u, 1000BASE-T Ethernet as per IEEE 802.3ab, 1000BASE-TX Ethernet as per TIA-854, 2.5GBASE-T and 5GBASE-T Ethernet as per IEEE 802.3bz, 10GBASE-T Ethernet as per IEEE 802.3an, Voice-Over-IP telephony (VOIP) as per TIA-TR41, digital telephony as per TIA-810-B, analog telephony as per TIA 470-C, and Power over Ethernet as per the IEEE 802.3af, IEEE802.3at, and IEEE802.3bt standards.

Installation of Data/Telecommunications Cabling System must satisfy requirements set forth in all parts and addenda of ANSI/TIA/EIA-568-C, and TIA-569-A, ISO/IEC 11801, and IEC 61156.

Contractor shall furnish and install cables, terminals, connectors, patch panels, and miscellaneous hardware required for delivery of a complete and working cable plant.

4.11) Cabinets and Racks

4.11.1) Securing Cabinets and Racks to Floor and to Each Other

Cabinets and racks installed by Contractor must be securely anchored and bolted to the floor. Wherever one cabinet or rack is installed directly adjacent to another cabinet or rack, the cabinets or racks must be securely connected using manufacture-approved baying kit.

4.11.2) Knockouts

Where knockouts in cabinet sheet metal are specified or are necessary, knockout will be fitted with a bushed steel chase nipple to prevent cable from contacting sharp surfaces of cut sheet metal and to allow proper packing of fire-stop/water-stop material at cabinet penetration. All unused knockouts in cabinet are to be covered with knockout seals, regardless of whether or not knockout was open prior to Contractor performing work.

4.11.3) Fire-stop and Water-stop for Cabinet Penetrations

Contractor shall insure that combination fire-stop/water-stop material is installed at all knockouts or other entrances to any cabinet in which Contractor performs work, regardless of whether or not Contractor disturbed fire-stop/water-stop, and whether or not fire-stop/water-stop was present prior to Contractor performing work.

Contractor shall install fire-stop/water-stop in any new cabinet penetration that contractor creates. Contractor shall insure that prior to the completion of the job, absolutely every cabinet penetration has combination fire-stop/water-stop installed.

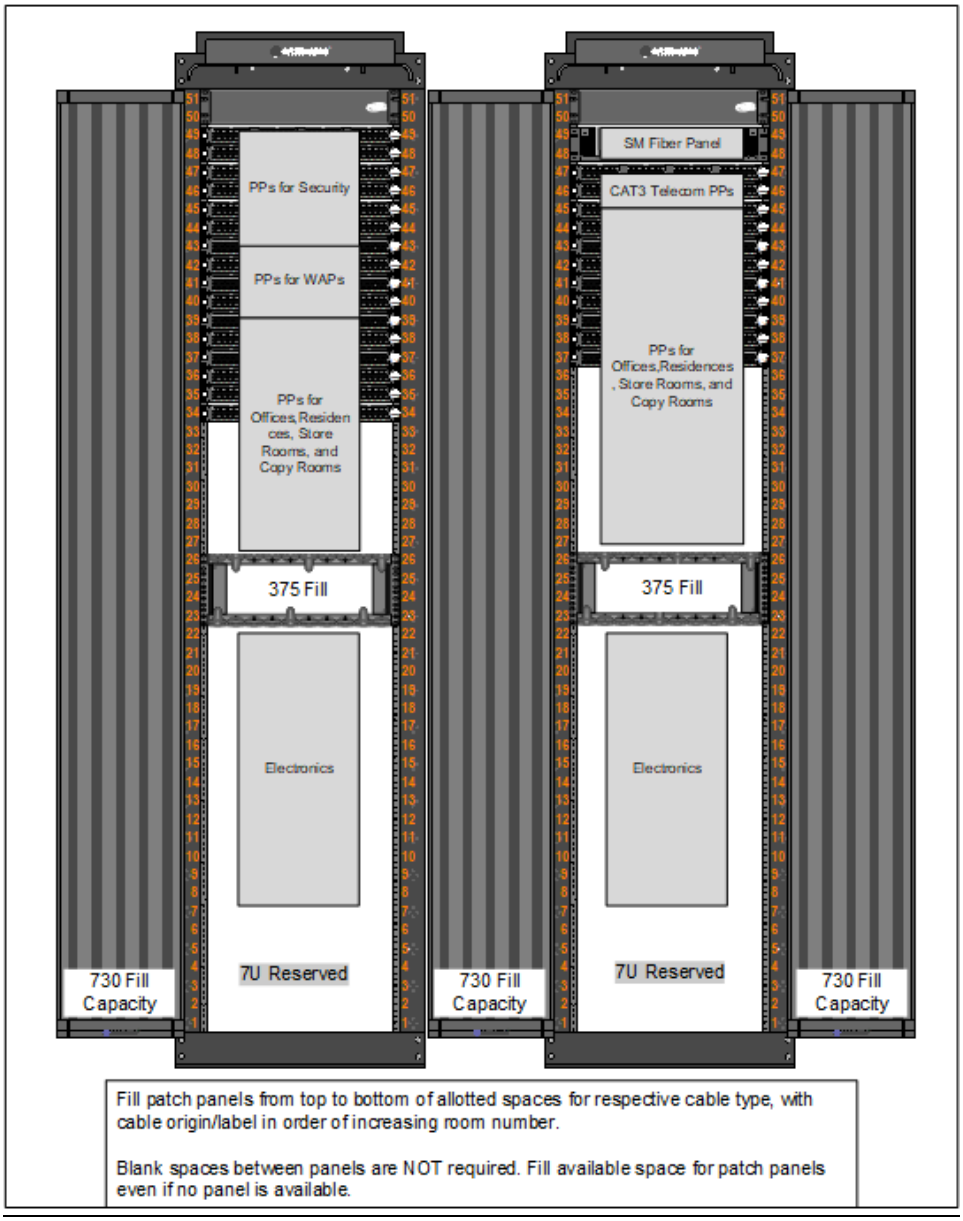
4.11.4) Cabinet or Rack Layout

The top eight rack units in each rack and cabinet are reserved for fiber, telecommunication feeder patch panel, and future use. Contractor will install first 24-port Category 6 / 6A patch panel below the eighth rack unit (8RU) from the top of the cabinet.

Patch panels and cable management will be installed in “blocks” of six rack units (6RU), with each 6RU “block” consisting of two 1RU 24-port patch panels, one 2RU slotted duct cable management, and 2RU of reserved space for equipment.

Directly below the 2U of reserved space at bottom of a “block”, subsequent “blocks” shall be installed in a similar fashion as long as space in rack permits entire block to be installed.

Example: Basic rack elevation of building data/telecommunications closet, with shaded “block”:



4.12) Drip Loops

For all cables Contractor installs, Contractor will create minimum 6” radius drip loops before cabinets, racks, and connection blocks. Drip loops shall not be located anywhere above or within three feet (4’) of cabinets, equipment, patch panels, and connection blocks, and shall direct any water traveling on cables away from such equipment.

4.13) Plywood Backboard

Plywood backboard shall be provided in whole 4’x8’ sections cut to maximum size and fit in the designated location.

Plywood backboard shall be mounted such that bottom edge of plywood is 36” AFF and top edge of plywood is 84” AFF.

Six 22-inch lengths of 12-gauge back-to-back 1-5/8” x 4-7/8” steel strut shall be mounted horizontally behind each whole piece of plywood to create a 4-7/8-inch accessible gap (standoff) for routing cable between the backboard and the wall, with one length of strut mounted roughly at each of the four corners and one length mounted roughly on center of the two longest sides of the plywood. Smaller cut sections of plywood shall be mounted using fewer lengths/pieces of Kindorf as appropriate.

Each length of strut shall be mechanically affixed to studs, to blocking, to masonry, or to structural steel behind the finished wall using two ½-inch Grade 8 carbon-steel bolts/washers/anchors.

Prior to installation, bolts and strut must be filed and deburred as to not to nick or cut cables that are routed behind backboard in the future.

Adequate materials, methods, and fasteners shall be utilized to insure proper support of the weight of the backboard assembly plus 600 pounds of static load on each 4’x8’ section of backboard.

Wood screws used in mounting equipment, cable, and supports to backboard shall not exceed the thickness of the backboard. Screws and other sharp objects must not protrude out rear of backboard where they may nick or cut cables that are routed behind backboard in the future.

Existing light fixtures, electrical outlets, switches, and other items fixed to designated wall must be avoided, or plywood must be cut around such items such that access to items is not hindered in any way.

The “good” finished side (the “A” side) of the fire-rated A/C plywood shall face away from mounting wall, and shall display manufacturer’s stamps confirming that it has been treated with fire-retardant chemical.

Plywood backboard shall be entirely unpainted so that stamps show clearly for all future fire inspections. At least one stamp in its entirety must be clearly visible on plywood at all times, regardless of what is mounted on the backboard.

4.14) Grounding

All components of the Data/Telecommunications Cabling System shall be properly grounded and bonded as per ANSI/TIA/EIA 607, and all applicable electrical codes. Electrical ground busbars shall be available on plywood backboards in all data/telecommunications closets

A complete connection to ground shall be formed from each structural metallic part of the cable plant to and through all others which parallel the route that a signal is designed to travel. Appropriate gauge copper ground cable as per code and standards shall be used to connect all components. Paint-piercing screws, grounding lugs, and split-bolt connectors shall be utilized as appropriate to insure proper connections.

All connections to the Grounding busbars for data/telecommunications closets shall all be made via UL-rated two-hole compress lugs – one-hole compression lugs are not acceptable. Each compression lug shall be crimped a minimum of twice to insure good connection to lug. Grounding busbars for data/telecommunications closets and associated lugs shall be cleaned prior to fastening of conductors, and an anti-oxidant shall be applied to contact area to control corrosion and reduce contact resistance.

Grounding busbars for data/telecommunications closets shall be installed no more than ten feet from electrical panel located in same data/telecommunications closet that serves the data/telecommunications system. A minimum gauge of #6 AWG cable designed for use in grounding/bonding applications shall be used to interconnect grounding/bonding components, and shall have a green insulating jacket that meets the fire ratings of its pathway. Any cable used to ground/bond newly-installed components shall be installed without splices.

A Telecommunications Bonding Backbone cable of at minimum #3/0 AWG cable designed for use in grounding/bonding applications shall be supplied and installed by Contractor to interconnect the Main Telecommunications Grounding Busbar and all Telecommunications Ground Busbar(s)as per ANSI/TIA/EIA J-STD-607-A, if one does not exist.

4.15) Keys to Cabinets and WAP Mounting Brackets

Keys to cabinets and WAP Mounting Brackets may be retained by Contractor until Final Completion, at which time all keys must be returned to Owner. Contractor shall not make copies of ANY key.

4.16) Service Slack

4.16.1) Data/telecommunications Outlet Service Slack

Each installed data/telecommunications cable shall provide a minimum of eight inches (8”) of service slack in the station outlet gang box at modular jack termination point, or as much as is allowed considering available space in gang box. Service slack shall be arranged in a loop and tucked in gang box, with consideration for the specified maximum bend radius of installed cable.

4.16.2) Additional Service Slack for Wireless Access Point Data Outlets

Each installed data cable designated for Wireless Access Point (WAP) connection shall have thirty feet (30’) of service slack coiled above the ceiling within 5’ of WAP outlet, and hung on nearest j-hook or other approved support using hook-and-loop fasteners.

4.16.3) Additional Service Slack for Spare Cables

Each installed data/telecommunications cable designated as a “Spare Cable” shall have fifty feet (50’) of service slack coiled above the ceiling, and hung on nearest j-hook or other approved support using hook-and-loop fasteners.

4.16.4) Data/Telecommunications closet and MDF Service Slack

4.16.4.1) Category 6 / 6a Cable

At each data/telecommunications closet, Category 6 / 6a cables shall be combed, secured to plywood backboard using hook-and-loop fasteners, and arranged in an S-curve such that ten feet (10’) of service slack is provided in the data/telecommunications closet.

With written approval or where preexisting conditions exist, contractor may alternatively lay service slack in data/telecommunications closet in an S-curve on adjoined cable trays that are dedicated for the purpose of dressing service slack. Service slack on cable tray shall be combed and secured to cable tray using hook-and-loop fasteners.

An additional three feet (3’) of service slack shall be provided in the cabinet or rack via a small “C-curve” secured to side rail of cabinet or rack with hook-and-loop fasteners, directly before cable enters rear of slotted duct cable management.

4.16.4.2) Telecommunications Feeder Cable Service Slack

At each data/telecommunications closet and telecommunications distribution frame, telecommunications feeder cable shall be neatly secured to plywood backboard using hook-and-loop fasteners, and arranged in a C-curve such that six feet (6’) of service slack is provided.

With written approval, contractor may alternatively lay telecommunications feeder cable service slack in a coil in data/telecommunications closet on adjoined cable trays that are dedicated for the purpose of dressing service slack. Service slack on cable tray shall be secured to cable tray using hook-and-loop fasteners.

An additional four feet (4’) of service slack on telecommunications feeder cable shall be provided in the cabinet or rack in data/telecommunications closet via an “S-curve” secured to side rail of cabinet or rack with hook-and-loop fasteners, directly before cable enters fiber-optic patch panel.

4.16.4.3) Fiber-optic Cable Service Slack

At each data/telecommunications closet, fiber-optic cable shall be neatly secured to plywood backboard using hook-and-loop fasteners, and arranged in a coil such that fifty feet (50') of service slack is provided in each data/telecommunications closet.

With written approval, contractor may alternatively lay fiber-optic cable service slack in a coil in data/telecommunications closet on adjoined cable trays that are dedicated for the purpose of dressing service slack. Service slack on cable tray shall be secured to cable tray using hook-and-loop fasteners.

An additional ten feet (10') of service slack on fiber-optic cable shall be provided in the cabinet or rack via an "S-curve" secured to side rail of cabinet or rack with hook-and-loop fasteners, directly before cable enters fiber-optic patch panel.

4.17) Strain Relief and Cable Dressing

The Contractor shall provide and install hook-and-loop fasteners ties, riser cable support grips and strain relief based upon field conditions to maintain orderly cable organization

Contractor shall neatly dress cable in data/telecommunications closets and securely bundle them at every two-foot interval using prescribed cable fastener. Separate cable fasteners shall be used to attach cable bundle to cable tray, cabinet, cable management, or other cable support in the room.

Contractor shall utilize strain relief system for all installed patch panels. Strain relief shall system include use of rear compartment of double-sided slotted duct cable management. Plastic strain relief bars that mount directly to patch panel are not acceptable. Strain relief will be installed in such a way that patch panel may be serviced with strain relief in place. Strain relief boots and termination caps shall be installed on the station outlet modular jack and patch panel, if provided as part of the assembly.

4.18) Data/telecommunications Cabling System

4.18.1) Data/telecommunications Outlets

4.18.1.1) Outlet Placement

Standard wall data/telecommunications outlets shall be installed on the wall entirely above baseboard or cove base, and approximately 15" AFF or matching existing electrical outlets at a minimum of 8” height on center.

4.18.1.1.1) Wall outlets from which EMT stub-up shall be provided shall be installed in a recessed extra-deep single gang electrical box (4”H x 2”W x 3.5”D)

4.18.1.1.2) Wall outlets retrofitted into sheetrock walls shall utilize “box eliminator” brackets. Box eliminator bracket must allow selected faceplate to be mounted flush, with no greater than 1/16” clearance to wall.

4.18.2) Termination

All Category 6 / 6a termination assemblies shall employ the TIA-568-B wiring configuration for color-coding of pinout/position.

In order to maintain the electrical and data transmission characteristics of Category 6 / 6a cables, the following practices must be observed during the termination of all Category 6 / 6a cabling:

4.18.2.1) Only remove the minimum amount of cable sheath necessary to properly terminate the wires.

4.18.2.2) Cable conductors are arranged in pairs. Each pair has a specific twist associated with that pair. Maintain the pair twist at all times. Do not untwist and then attempt to re-twist cable pairs while terminating. Separate the conductors in a pair only as much as absolutely necessary to terminate the cable onto the connector. For all twisted pair cables the maximum untwisted length is not to exceed 0.5 inches.

4.18.2.3) Never remove insulation from the conductors. All of the terminations in this project shall be of the insulation displacement (IDC) type.

4.18.2.4) Leave the minimum amount of conductor after termination in an IDC connector. If necessary, use a cable scissor to trim extra length. Under no circumstances shall the excess length exceed 0.125 inches above the terminator block face edge.

4.19) Telecommunications Feeder Cable

Telecommunications feeder cable shall be terminated on PDS 110-style insulation displacement connectors on rear of in 19” rack-mount telecommunications feeder patch panel at data/telecommunications closet end, and on 66M cross-connect punch-down block at the telecommunications distribution frame end.

An intermediary gas protector panel may be specified for data/telecommunications closet, in which case it shall be placed on plywood backboard in data/telecommunications closet.

One pair of conductors shall be terminated on each port of 19” rack-mount telecommunications feeder patch panel, in color order according to TIA/PIC standards. Pairs shall be terminated in corresponding order on left side of telecommunications punch-down block at building Distribution Frame.

4.20) Fiber-Optic Cable

Fiber-optic cable shall be run within innerduct or dedicated ¾" EMT for the entirety of the cable length between data/telecommunications closets.

A conduit less than or equal to 1.5" in diameter that a fiber-optic cable is run through shall be deemed non-re-enterable. Additional cables shall not be pulled through this conduit following testing/certification of fiber-optic cable, in order to insure performance of the fiber-optic cable.

When run through conduit greater than 1.5" in diameter or on cable tray, fiber-optic cable shall be run within innerduct.

When otherwise run above suspended-ceilings, in mechanical rooms, and in mechanical spaces, fiber-optic cable shall be run in dedicated ¾" EMT.

When otherwise run below suspended-ceilings and in occupied areas that require aesthetics to be maintained, fiber-optic cable shall be run in raceway that is specifically designed to maintain bend radius of the fiber-optic cable.

4.20.1) Non-Armored Fiber-Optic Cable

No exceptions shall be made in any circumstance regarding the above use of innerduct/EMT/raceway with non-armored fiber-optic cable.

4.20.2) Armored Fiber-Optic Cable

Exceptions may be made under certain circumstances regarding the above use of innerduct/EMT/raceway with armored fiber-optic cable, but only if explicit written permission is granted from both Owner Project Manager and Owner Technical Contact.

4.20.3) Patch Panels and Termination

Termination of fiber-optic cable at fiber-optic patch panels shall confirm to TIA-568-C. SC duplex connectors shall be used for all single-mode fiber termination.

The highest level of workmanship and attention to detail shall be exercised during installation and termination of fiber-optic cable.

Only cable manufacturer compatible tools and materials such as crimpers, fan-outs, and connectors shall be used in terminating fiber-optic cable termination.

4.20.4) Splicing and Fusion Splicing

Where fusions splices of fiber-optic cable are specified, contractor shall use fusion splicing tool from same manufacturer as cable being fused, to insure optimal results. Each fusion splice shall be tested at point of fuse, and less than 0.1 dB

Mechanical splices of fiber optic cable are not permitted.

4.21) Pathways and Spaces

4.21.1) Pathways

Cable pathways will be constructed of appropriate cable supports such as J-hooks, Loop Cable Hangers, Basket Cable Tray, raceways, or conduits.

J-hooks, Loop Cable Hangers, or basket cable tray may be used to support cable above suspended-ceiling, where there is no requirement for a specific type of cable support at that location.

Cable supports installed above suspended-ceilings shall be supported from the building structure and not from the existing ceiling support cables, grid, rods, or acoustical tees. Cable supports installed above suspended-ceiling shall be installed below plenum partition, if enough space exists between ceiling and plenum partition. If insufficient space exists between ceiling and plenum partition to install cable supports, then alternate pathway or method must be proposed by Contractor and approved in writing by Owner.

Threaded support rods shall extend a minimum of one inch (1") below cable tray wherever space allows to accommodate extension hardware that may be need to be added in the future.

Conduit, cable tray, innerduct, and raceway installation shall be continuous and connected appropriately to all boxes, cabinets, and other pathway components. Manufacturer's fitting must be used for all transitions. Caps and gaskets shall be used to prevent dirt and moisture from entering installed conduit, innerduct, and raceway where appropriate. Nylon bushings shall be used on all stubs and points of connection to prevent sharp edges from damaging cable and pull tape.

Pathway shall be constructed with Owner's hostile environment in mind. With the exception of designated Mechanical Room spaces, cables must not be exposed when run below finished ceilings -- all cables shall be run within conduit, within raceway, in walls, or above suspended-ceilings. Cables must be run within conduit or metallic raceway on exposed walls or ceilings. Raceway may be used as an alternate path when it is desirable to avoid ceiling space, though any use of conduit or raceway not explicitly prescribed in the scope of work must be approved in writing by Owner prior to bid submission.

Headroom shall be maintained when installing conduit, cable tray, raceway, J-hooks, and cable.

4.21.1.1) Metallic Recessed-Mount Device Boxes

Metallic Recessed-Mount Device Boxes shall be generally used for Category 6 / 6A outlets on gypsum-board (sheetrock) walls Category 6A Wireless Access Point (WAP) outlets installed in gypsum-board ceilings – when either are installed during new construction or during gut-renovations.

During new construction and gut-renovations, Metallic Recessed-Mount Device Box shall be installed with 3/4-inch EMT run to box while finished wall is not yet built, and structure/studs are exposed. The 3/4-inch EMT shall stub to nearest accessible cable tray or nearest accessible ACT/open ceiling.

Cables shall not be installed in Metallic Recessed-Mount Device Boxes until gypsum-board has been installed. Once cables are installed and until room has been completely painted, a temporary cover shall be placed on box to prevent paint and primer from contaminating cable jacket. If ceiling is to be sprayed or painted, then cables above ceiling shall be temporarily wrapped with protective plastic covering to prevent paint and primer or other spray-on materials from contaminating cable jacket

4.21.1.1.1) General Category 6 / 6A outlets

Metallic Recessed-Mount Device Boxes for general Category 6 outlets shall be reduced with single-gang raised reducing ring, unless otherwise noted.

4.21.1.1.2) Category 6A for Wireless Access Point (WAP) or Surveillance Camera installation in gypsum-board ceilings

The following assembly shall be mechanically fastened together:

4.21.1.1.2.1) One (1) Metallic Recessed-Mount Device box (facing downward),
4.21.1.1.2.2) One (1) Flat single-gang reducing ring below,
4.21.1.1.2.3) One (1) Standard Category 6A faceplate, specified herein, facing downward,
4.21.1.1.2.4) One (1) Galvanized steel extension collar that is 2-1/8” deep x 4-inch wide x 4-inch high, and
4.21.1.1.2.5) One (1) Single-gang raised reducing ring (facing downward)

Metallic Recessed-Mount Device box in the above assembly shall be supported in ceiling by 8-inch max depth adjustable height box hanger, specified herein.

WAP may be connected with assembly in place, and WAP bracket mounted to single-gang raised reducing ring, following all priming and painting.

Raised reducing ring and extension collar shall be removable to permit removing faceplate, in order to be able to service Category 6A outlets.

4.21.1.2) Metallic Surface-Mount Device Boxes

Metallic Surface-Mount Device Boxes shall be used for Category 6 / 6A outlets in industrial areas, in Mechanical Equipment Rooms, and above ACT ceilings.

Metallic Surface-Mount Device Boxes shall be reduced with single-gang flat reducing ring, unless otherwise noted.

4.21.1.3) Non-Metallic Surface-Mount Device Boxes

Non-Metallic Surface-mount device boxes shall be constructed entirely of PVC, and shall be ivory in color.

NM surface-mount device boxes shall be 2 7/8” inches deep, and shall be single-gang, 3 inches wide by, 4 7/8” high.

NM surface mount boxes shall be of same manufacturer and compatible with approved raceway, and shall have knockouts/twist-outs for selected raceway model.

NM surface-mount device boxes shall be designed to be secured to wall mechanically using screws or bolts.

4.21.1.4) J-hooks and Loop Cable Hangers

J-hooks and/or Loop Cable Hangers shall be installed no more than six feet apart. When transitioning from J-hook to another approved cable support or conduit, J-hook shall be at most four feet from alternate cable support or conduit.

4.21.1.5) Basket Cable Tray and Ladder Cable Tray

Contractor shall install anchors, threaded rod, clamps and bars as needed to properly install and secure cable tray. Contractor shall use support methods, splice methods, fittings, and materials that are recommended by the cable tray manufacturer to continuously connect sections of cable tray and fittings. Cable tray shall be grounded per NEC and manufacturer standards and to the same ground as equipment rack. Contractor shall provide a minimum 12-inch working clearance above and on either side of encompassing cable tray to permit access for installing and maintaining cables. Contractor shall install cable tray in accordance with recognized industry practices, and in accordance with all of the following:

4.21.1.5.1) NEMA VE-2 2000
4.21.1.5.2) NEC and applicable portions of NFPA 70
4.21.1.5.3) NECA’s “Standards of Installation” pertaining to general electrical installation practices

4.21.2) Avoidance of Electromagnetic Interference Sources

All conduit, cable tray, and cables containing metallic elements -- including, but not limited to dielectric/non-metallic cable housed in metallic armor -- shall be routed in such a way as to maintain the following distances from sources of electromagnetic interference:

6 inches from power lines 2KVA or less.
12 inches from fluorescent lighting such as fluorescent/HID lamps
60 inches from transformers, motors, or power lines of 5KVA and up

4.21.3) Innerduct

All cables running within conduit of 3” (three inch) or greater outer diameter that is at 0% fill (unused) initially, and is expected to be filled to less than 25% upon completion of job must be run within innerduct supplied and installed by Contractor.

When installing innerduct in an unused conduit, Contractor shall simultaneously pull the maximum number of 1” and/or 1.25” diameter innerduct capable of fitting in the conduit, such that the maximum number of innerducts is provided for future use.

Pull tape shall be installed in each innerduct.

4.21.4) Conduit

Conduit shall be run in parallel, wherever practical, and secured to existing steel channel and steel beams using conduit straps or clamps. Existing steel channel or trapeze may be used if additional load can be supported at appropriate safety factor.

Unless specified, conduit fill ratio must never exceed 40% or the fill ratio specified by the firestopping assembly, whichever is lesser. For conduit of over 50 feet of length with no intermediate pull point, the fill ratio must never exceed 30%.

There shall not be more than 100 feet in length of conduit between pull boxes or conduit ends. Each 30-degrees of bend shall be considered as 10 feet of conduit when determining pull box placement.

There shall not be between two pull boxes or conduit ends more than a 180 degree cumulative total of bends.

Pull boxes shall not be used in place of bends. Conduit ends must be aligned in parallel on opposite sides within each pull box, such that they permit a straight pull through a pull box. Angled pulls and U-pulls through pull boxes are not permitted.

Example:

A length of conduit originating from a pull box, containing one 90-degree bend (counted as 30 feet of a 100 foot total budget), must not contain more than 70 feet of straight conduit (30 + 70 = 100 feet) before terminating in a pull box.

4.21.5) Raceway

Surface-mount raceway (raceway) shall be provided and installed in such a manner to optimize aesthetics. Appropriate raceway fittings such as unions, bends, and end-caps must be provided and installed by Contractor. In-field mitering of raceway in lieu of using fittings is not permitted.

Raceway and fittings used for data/telecommunications cable must be appropriate for a Category 6 / 6A installation, maintaining minimum bend radius and other properties of the Category 6 / 6A cable contained within.

Raceway fill shall not exceed 80% of the raceway manufacturer's recommendations, such that 20% spare capacity remains available in the raceway for future use without exceeding manufacturer's recommendations.

Raceway shall be mechanically mounted as per manufacturer's instructions using screws, anchors, and/or bolts. Raceway shall not be mounted with adhesive.

Raceway shall run vertically near the corners of room and horizontally at same height of data/telecommunications outlets. Raceway shall not run near the middle of walls. Installed raceway shall not cover or prevent access to any existing service, outlet, control, or access panel. Raceway covers must be installed and secured properly.

4.21.6) Pulling Tension

No cable shall be installed with a pulling tension exceeding the maximum recommended by the manufacturer. Pulling tension shall be monitored with a tension gauge (tensiometer) to ensure the maximum tension rating of cable is not exceeded.

A suitable breakaway link (swivel) should be used as a failsafe to insure maximum pulling tension of cable is not exceeded. Breakaway link/swivel shall be used as a failsafe in this respect, and not as a primary means of controlling cable tension.

If multiple cables are to be pulled at one time, the Contractor shall make the necessary allowances to back off the pulling tension of the bundle.

As necessary, for cable pulls in conduit, the Contractor shall use only an approved lubricant compatible with the cable outer jacket insulation, innerduct, and pull tape.

4.21.7) Pull tape

Contractor shall install new pull tape in all conduits 2" or greater in trade size installed by contractor, and in all pre-existing conduits 2" or greater in trade size utilized by Contractor.

Pull tape installed in conduits and innerducts shall be lubricated with a lubricant appropriate for the selected pull tape, innerduct, and installed cable, as necessary to prevent burn-through of pull tape.

All installed pull tape shall be tied securely on both ends of the conduit to a fixed object that is attached to or part of the conduit system. Pull tape installed in a conduit or cable tray shall include 4' of slack on both ends. Slack shall be rolled and tied neatly.

4.21.8) Pull Cord

Contractor shall install pull cord in all conduits less than 2" in trade size installed or utilized by Contractor, all raceways installed or utilized by Contractor, all cable tray installed or utilized by contractor, and all walls fished by Contractor.

4.21.9) Bend Radii

4.21.9.1) Conduits

The minimum inside radius for conduits 2-inch in diameter or less shall be six times the internal diameter of the conduit. Conduits having diameter greater than two inches shall have a minimum inside radius of ten times the internal diameter of the conduit.

4.21.9.2) Cable tray (Basket Cable Tray and Ladder Cable Tray)

Radius shields shall be installed at all cable tray lateral bends, and must maintain a minimum 6 inch radius in interior of tray.

Waterfall/radius-drop fittings shall be installed at all cable tray vertical transitions, where cables transition more than six inches (6”) vertically without support. Waterfall/radius-drop fittings shall have minimum of 3 inch radius.

4.21.9.3) Cables

All cables shall be installed with a bend radius greater than or equal to the bend radius recommended by the cable manufacturer to maintain cable rating and transmission properties.

As necessary, cable guides shall be used to maintain recommended bend radii during pulling.

Cables shall be secured using prescribed cable fasteners so as to prevent migration and maintain proper bend radius after initial installation.

Contractor shall secure the cable bundle at each J-hook with a prescribed cable fastener.

4.22) Labeling

All outlets, patch panel ports, cable ends, and firestopping locations shall be clearly labeled according the Cable Installation Labeling Convention.

A blank Circuit Endpoint Table Spreadsheet (Microsoft Excel spreadsheet form) shall be provided by Owner Technical Contact upon request by Contractor. The Circuit Endpoint Table Spreadsheet can be used as an aid for quickly creating labels that are in compliance with the Cable Installation Labeling Convention.

Contractor must complete and submit an electronic copy of the Circuit Endpoint Table Spreadsheet based on as-built termination locations and the Cable Installation Labeling Convention.

Following receipt of Contractor submittal, Owner Technical Contact shall review and respond to submittal with either “APPROVED”, “APPROVED AS NOTED”, or “REJECTED”. Notes shall direct Contractor specifically and/or generally on corrections that must be made to the spreadsheet before it is resubmitted by Contractor.

4.22.1) Cable Installation Labeling Convention

The Cable Installation Labeling Convention shall be used to identify all components of installed systems, including but not limited to equipment, cable, termination points (such as modular jacks, patch panel ports, or other connectors), and firestop installation, in all documentation, test results, and labeling.

Cable Installation Labeling Convention is an ANSI/TIA-606-A -compatible identification standard.

There are a total of six fields in each name: five identifying fixed-length fields used to identify *where* an item is located and *what* the item is, followed by one *variable length* field used to identify a port on the item.

These six fields can be split up into two parts: the first part identifying a general location and the second part describing specific location of and on an object within that location.

4.22.1.1) General Location Fields

The first three fields describe the general location of an item. This will describe the building, room, suite, and possibly a general location within a room (e.g. a Rack or Cabinet within the room, grid coordinates within room, etc.). These three fields are a total of exactly eight characters in length (2+4+2).

1) Building Code field (two letters)

Examples of Building Code field:
“NS” for Natural Sciences
“MF” for the Center for Media, Film, and Theater
“MT” for Maintenance Tunnels

2) Room or Suite Number field (four digits, typically)

Examples of Room or Suite Number field:
“1023” for room number 1023
“L120” for room number L120
“0055” for apartment 55

3) Location in Suite/Room field (letter+digit, or "-" for either/both)

Use "-" (hyphen) in place of letter or digit if there is no pertinent information for either, and "--" (two hyphens) if no pertinent information for both.

Examples of Location in Suite/Room field:
"K6" for network and server room grid coordinates,
"-2" for rack #2 in a room with three racks in it,
"L-" for living room in a residence suite,
"A-" for bedroom A in a residence suite,
"B-" for bedroom B in a residence suite,
or a placeholder of two hyphens ("--") if not pertinent.

An optional line break (newline/carriage return) may appear after the three General Location Fields where label does not allow all six fields to be legibly printed on a single line.

4.22.1.2) Item Identification

The last three fields identify a specific location of a particular type of item within the general location; specify the unique identification number of that particular type of item in the location; and specify a particular port on that particular item. This part contains three fields and totals four or more characters in length:

4) Item Type Code field (two letters)

Examples of Item Type Code field:
"MJ" for Modular Jack faceplate
"PP" for Patch Panel
"MP" for Modular Plug (Single-Connector Modified Permanent Link)

5) Index number of Item within room or rack field (two digits)

Examples of Item within room or rack field:
"03" for the third item of its type in the location

6) [Optional] Port Number field**: (optional: "-"+ variable length and content)

** The Index Number field is always separated from the Port Number field by a hyphen (e.g. "03-9" or "03-4" or "3-C")

Always pad numeric fields that may be two digits with a leading zero (e.g. "-00", "-01", ... "-10", "-11", etc.), when there is only one significant digit (0-9), in order to permit ease of reading in table format and ease of electronic searching.

Always pad alphabetic data that may be two letters with extra leading hyphen (e.g. "—A", "—B", … "-AA", "-AB", etc.), when there is only one significant letter (A-Z), in order to permit ease of reading in table format and ease of electronic searching.

Examples of Item within room or rack field:
"-4" for modular jack "4", where jacks are numbered 1-4
"-09" for panel port "9", where ports are numbered 1-24
"-C" for device port "C", where ports are numbers A-Z
"—C" for device port "C", where ports numbered A-ZZ
"-B5" for fiber optic patch panel six-pack "A" port "5"

“-B05 for fiber optic patch panel twelve-pack “A” port “5”

[See illustration next page]

Building Code

Format

Two UPPERCASE alphabetic characters

Contents

Code as follows:

AD	Administration
MF	Ctr for Media Film and Theater
CN	Campus Center North
CS	Campus Center South
DA	Dance
FM	Facilities Management
HU	Humanities
LI	Library
MU	Music
NM	Neuberger Museum
NS	Natural Sciences
SS	Social Science
ST	Student Services Building
MS	Mechanical Services below ST
MT	Maintenance Tunnel
PA	Performing Arts Center
PE	Physical Education
VA	Visual Arts
R*	Residence area "*" (e.g. "RA") Use Dormitory or Apartment street code assigned by ResLife

Room or Suite Number

Format

(Typically) Four numeric characters, or as according to building plans. Pad with leading zeros if plans indicate less than 4-digit room number.

Contents

Room number in four-digits
(e.g. "SS0021")

OR

Apartment building/unit numbers
(e.g. "RG0053")

Notes

This field MUST be padded with leading zeros to create four-digit number.

Alphabetical character in room identifier shall be removed and moved to next field ("Sub-Room")

Sub-Room / Cabinet

Format

One UPPERCASE alphabetic character or a hyphen, followed by one numeric character or a hyphen

Contents

Sub-room in suite (A, B, C, or "L" for living room) or hyphen
(e.g. "RJ0041**A**-")

OR

Coordinates or serial number of cabinet or rack in room
(e.g. " SS0027F**5**")

OR

Two hyphens, if nothing relevant
(e.g. "LI1014**--**")

Notes

Hyphens ("-") can be used in one or both characters of this field if field information is irrelevant (e.g. a simple, single room) in order to make this field exactly two characters in length.

C S 0 0 0 8 - 2 P P 0 1 - 0 1

Item Type Code

Format

Two UPPERCASE alphabetic characters

Contents

Code as follows examples below:

MJ	Modular Jack faceplate/box
PP	Patch Panel
MP	Modular Plug (SCMPL/OSP)
FL	Firestopping location
SV	Server
WS	Workstation
SW	Switch
RO	Router
MC	Media Converter
PS	Power Supply / UPS
TE	Terminal
MO	Modem
AB	AB, ABC, ABCD Switch
KV	KVM Switch
AP	Wireless Access Point (device, not data outlet)

Item Index Number

Format

Two numeric characters

Contents

Unique index number of item in the room, cabinet, or rack

Notes

Index numbers shall unless otherwise specified begin at "01" for equipment of a certain type located at the top of a rack or cabinet and increment for lower equipment of same type in same rack or cabinet.

Port Number

Format

Optional field. May contain any number of characters in any format. Possible values depend on item.

Contents

Used to specify port number

Notes

Always separate from previous field with a hyphen. Use values as labeled by manufacturer on an item, if available (e.g. a certain manufacturer's faceplate may have molded plastic labels of "A", "B", "C", while another might use "1", "2", "3"). If manufacturer does not print labels on ports, then number ports starting at one (1) on top left and proceeding all the way to right, and then down.

4.22.2) Data/telecommunications Outlet Labels

Contractor shall label data/telecommunications outlet faceplates with appropriate far-end (patch panel) termination address for each modular jack, as in the following example:

Example:

NS2055A-
PP01-24

(Showing room NS2055, Cabinet “A”, Patch Panel #01, port 24)

Where a label insert slot or space is available on faceplate, insert a compatible non-adhesive label, and provide and install manufacturer-supplied clear plastic cover over label slot.

4.22.3) Patch Panel Labels

Contractor shall label patch panel ports using compatible labels and label covers.

Contractor shall label patch panel ports with appropriate far-end (Outlet) termination address as in the following example:

Example:

NS1010B-
MJ06-4

(Showing room “NS1010B”, Modular Jack faceplate “06”, Jack “4”)

Where a label insert slot or space is available on patch panel, insert a compatible non-adhesive label, and provide and install manufacturer-supplied clear plastic cover over label slot.

4.22.4) Cable Marking Labels

All cables shall have wrap labels affixed to cable at both ends between three inches (3”) and five inches (5”) from each termination point. The three-inch space is very important to permit future re-termination of cable without need to remove and re-label each cable.

Contractor shall label each cable end with the appropriate near and far-end termination address, as in the following example:

Example:

NS1010B-MJ06-4
NS2055A-PP01-24

(Label on outlet-side of cable run between NS1010B-MJ06-4 and NS255A-PP01-24)

NS2055A-PP01-24
NS1010B-MJ06-4

(Label on panel-side of cable run between NS1010B-MJ06-4 and NS255A-PP01-24)

If label media does not permit all text on a single label, then applying two (2) labels to cable shall be acceptable, such that text read left-to-right reads in the same order.

4.22.5) Labeling of Firestopping Locations

Contractor shall neatly and legibly mark firestopping locations with firestopping location name, according to this convention, using permanent marker on or adjacent to the firestopping material, in a conspicuous location.

If Contractor cannot mark firestopping location name on firestopping materials, then Contractor shall mark firestopping location name on the firestopping barrier or assembly, directly adjacent to firestopping material.

Contractor shall consider aesthetics of surrounding area when labeling/marking firestopping locations.

Example:

4.22.6) Fiber Optic Cable Warning Labels

Fiber optic cable warning labels shall be placed on all innerduct containing fiber optic cable, within two feet of location where innerduct enters or exits conduit.

4.23) Safety and Code Requirements

Contractor will adhere to all applicable local, state, and federal laws and codes.

4.24) Firestopping

Contractor shall provide and install Firestopping materials at all penetrations of fire-rated barriers, both existing and created by Contractor, through which any cable, conduit, or sleeve installed by the Contractor passes.

Contractor shall provide and install Firestopping materials in the interior of all conduits, sleeves, and raceways that are installed or utilized by Contractor and that traverse a fire-rated barrier. Threaded metal caps may be utilized, as per applicable codes, to close-off unused conduits and/or sleeves.

Firestopping materials shall be installed according to code, according to certification listing, and according to firestopping manufacturer instructions. Firestopping materials used must meet the hourly rating of the floor or wall penetrated.

4.24.1) Firestopping product type

The type of firestopping utilized in each particular case shall be determined based on this Specification, on firestopping manufacturer instructions, on code, on certification listing, and on particular application including but not limited to:

4.24.1.1) Barrier or assembly in which the firestopping is being installed
4.24.1.2) Size of penetration
4.24.1.3) Materials (e.g. cables, conduit, basket tray, etc.) that shall traverse or adjoin the penetration

4.24.2) Fire Rated Pathway Devices

4.24.2.1) Fire Rated Pathway Devices shall be the preferred method of firestopping and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.
4.24.2.2) Cable trays shall terminate at each barrier and resume on the opposite side such that cables pass independently through fire-rated pathway devices. Cable tray shall be rigidly supported independent from fire-rated pathway devices on each side of barrier.
4.24.2.3) Install through-penetration firestop systems in accordance with Performance Criteria and in accordance with the conditions of testing and classification as specified in the published design.

4.24.3) Firestop Putty, Firestop Caulk, and Firestop Foam

Where it is not practical to use a Fire Rated Pathway Device, Firestop Putty/Caulk/Foam may be used.

4.24.3.1) Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accordance with manufacturer’s installation instructions and technical information.
4.24.3.2) Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellants, and any other substances that may inhibit optimum adhesion.
4.24.3.3) Provide masking and temporary covering to protect adjacent surfaces.

4.24.4) Firestopping Pillows

Pillow-type firestopping may be used in conduits if and where code permits. If firestopping pillows are utilized, then all firestopping pillow manufacturer instructions and certification listing must be adhered to, including but not limited to those pertaining to compression ratio, cable bundling, and hose-stream dislodgement prevention. Proper compression ratio must be maintained as per certification listing and manufacturer instructions. Cable bundles must be shaped properly as per certification listing and manufacturer instructions in order to prevent smoke penetration between cables. Wire mesh or other material must be installed on larger openings to prevent dislodgement of pillow as per certification listing and manufacturer instructions.

Contractor shall submit compression ratio calculations to the Owner Project Manager for each penetration in which a firestopping pillow is used by Contractor, including:

4.24.4.1) any penetration in which a new firestopping pillow is installed by Contractor
4.24.4.2) any existing penetration used by contractor in which an existing firestopping pillow has been disturbed by Contractor
4.24.4.3) any penetration where a cable has been added or removed by Contractor

4.24.5) Firestopping of Data/Telecommunications Cabinet Penetrations

Contractor shall create and maintain fire, smoke, and watertight seal of firestopping for data/telecommunications cabinet penetrations.

4.25) Testing and Certification Requirements

4.25.1) Independent Testing and Certification Requirement

Contractor shall arrange to have a qualified 3rd-Party independent inspecting and testing agency perform field testing and submit certification and observation reports for each and every cable installed by Contractor, including 100% of installed fiber optic cable strands, 100% of installed Category 6 / 6A Cable permanent links, 100% of installed telephone feeder/trunk cable pairs, and 100% of installed security/surveillance cables.

Field test certification and observation reports shall indicate and interpret test results relative to compliance with performance requirements of the installed systems, and as defined herein.

This Independent Testing and Certification Requirement may at the option of Owner be waived in the Scope of Work or in a Transmittal signed by both the Owner Project Manager and Purchase College Technical Contact. If the Independent Testing and Certification Requirement is waived in such a way, then all certification and testing requirements shall be maintained save that for the requirement of having an independent 3rd-Party perform the testing and certification: Contractor shall submit field test certification reports, as defined herein, from a qualified employee for 100% of cables installed by Contractor.

4.25.2) All Testing to be witnessed and/or reviewed by Owner

The Owner Project Manager and the Owner Technical Contact shall be invited to witness and/or review field-testing.

The Owner Project Manager and the Owner Technical Contact shall be notified of the start date of the testing phase five (5) business days before testing commences.

The Owner Project Manager will select a random sample of 5% of the installed cables. Owner may test these randomly selected cables. The results obtained may be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, then Contractor under supervision of Owner Technical Contact's representative shall repeat 100% testing at no cost to the Owner.

4.25.3) Category 6 / 6A Cable Testing

100% of the Category 6 / 6A cables in the installation shall be tested in accordance with the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-C, and with this Specification.

The installed twisted-pair links shall be tested from the patch panel or termination block, to the data/telecommunications outlet against the "Permanent Link" performance limits specification as defined in ANSI/TIA/EIA-568-C.

4.25.3.1) Technician Qualifications

All tests shall be executed by trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof. Appropriate training programs include but are not limited to installation certification programs provided by BICSI or the ACP.

4.25.3.2) Test Equipment Accuracy

The test equipment (tester) shall comply with or exceed the accuracy requirements for enhanced level II (Level II-E) field testers as defined in TIA-568; Annex I: Section I.4. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table I.4 of Annex I of TIA/EIA-568-B.2. (Table I.5 in this TIA document specifies the accuracy requirements for the Channel configuration.)

The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor.

The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.

4.25.3.3) The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in “Performance Test Parameters”, below). Any Fail, Fail*, or marginal pass (“Pass*”) result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must pass - the accuracy margin of the testing device.

A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. (Reference TIA-568; Annex I: Section I.2.2)

4.25.3.4) Performance Test Parameters

The test parameters for Category 6 / 6A are defined in ANSI/TIA/EIA standard TIA-568-B.1; The test of each Category 6 / 6A link shall contain all of the following parameters as detailed below. In order to pass the link test all measurements must meet or exceed the limit value determined in the TIA-568.1 standard at each frequency in the range as prescribed by the standards referenced herein.

All test measurement points at all frequency ranges required are to be recorded in the test results information as detailed in Section 4.26.1.3) (“Database Detailed Information”)

4.25.3.4.1) Wire Map [as defined in TIA/EIA-568-B.1]

4.25.3.4.2) Length [as defined in TIA/EIA-568-B.1]

4.25.3.4.3) Insertion Loss (Attenuation) [as defined in TIA/EIA-568-B.1]

4.25.3.4.4) NEXT Loss, pair-to-pair [as defined in TIA/EIA-568-B.1]

4.25.3.4.5) PSNEXT Loss [as defined in TIA/EIA-568-B.1]

4.25.3.4.6) ELFEXT Loss, pair-to-pair [as defined in TIA/EIA-568-B.1]

4.25.3.4.7) PSELFEXT Loss [as defined in TIA/EIA-568-B.1]

4.25.3.4.8) Return Loss [as defined in TIA/EIA-568-B.1]

4.25.3.4.9) ACR (Attenuation to crosstalk ratio) [This parameter is not demanded by the standards but may be required in order to obtain the premise wiring vendor's warranty. Premise wiring vendor's parameters shall prevail.]

This calculation yields 12 combinations – six from each end of the link.

Test results shall identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ACR.

These wire pair combinations must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

4.25.3.4.10) PSACR [This parameter is not required by the standards but may be required in order to obtain the premise wiring vendor's warranty. Premise wiring vendor's parameters shall prevail.]

This calculation yields 8 combinations – one for each wire pair from both ends of the link.

Test results shall identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSACR. These wire pairs must be identified for the tests performed from each end. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

4.25.3.4.11) Propagation Delay [as defined in TIA/EIA-568-B.1; Section 11.2.4.10]

4.25.3.4.12) Delay Skew [as defined in TIA/EIA-568-B.1]

4.25.3.4.13) DC Loop Resistance [as defined by TIA/EIA-568-C.2]

4.25.3.4.14) DC Resistance Unbalance within a pair [as defined by TIA/EIA-568-C.2]

4.25.4) Telecommunications Feeder Cable Testing

100% of the Category 3 cables in the installation shall be tested in accordance with the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-B and with this Specification.

All pairs of the installed telecommunications feeder cable shall be tested and shall be confirmed meet or exceed Category 3 specification as per TIA-568-B.

The installed telecommunications feeder cable shall be tested from the telecommunications feeder patch panel, to the MDF connection block against performance limits specification as defined in ANSI/TIA/EIA-568-B.Technician Qualifications

All tests shall be executed by trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof. Appropriate training programs include but are not limited to installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals).

4.25.4.1) Test Equipment Accuracy

The test equipment (tester) shall comply with or exceed the accuracy requirements for enhanced level II (Level II-E) field testers as defined in TIA-568; Annex I: Section I.4. The tester including the appropriate interface adapter must meet the specified accuracy requirements

The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor.

The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. I

4.25.4.2) The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests. Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.

A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks.

4.25.4.3) Performance Test Parameters

The test parameters for Category 3 are defined in ANSI/TIA/EIA standard TIA-568-B; The test of each Category 3 link shall contain all parameters as required by TIA-568-B for Category 3 installed permanent link. In order to pass the link test all measurements must meet or exceed the limit value determined in the TIA-568.B standard at each frequency in the range from 1 MHz through 16 MHz.

4.25.5) Fiber-Optic Cable Testing

This Section includes the minimum requirements for the test certification and administration of backbone and horizontal optical fiber cabling.

Contractor shall notify the Owner Project Manager and the Owner Technical Contact of any additional tests that are deemed necessary to guarantee a fully functional system as described under this Specification. The contractor shall carry out and record any additional measurement results at no additional charge.

4.25.5.1) Testing Scope

4.25.5.1.1) Testing shall be carried out in accordance with this Specification. This includes testing the attenuation and polarity of the installed cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber endfaces shall also be verified.

4.25.5.1.2) Testing shall be performed on each cabling link (connector to connector).

4.25.5.1.2.1) Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

4.25.5.1.3) All tests shall be documented including OLTS dual wavelength attenuation measurements for multimode and singlemode links and channels and OTDR traces and event tables for multimode and singlemode links and channels.

4.25.5.1.3.1) Documentation shall also include optical length measurements and pictures of the connector endface.

4.25.5.2) Quality Assurance

4.25.5.2.1) All testing procedures and field-test instruments shall comply with applicable requirements of:

4.25.5.2.1.1) ANSI Z136.2, ANS For Safe Use Of Optical Fiber Communication Systems Utilizing Laser Diode And LED Sources

4.25.5.2.1.2) ANSI/EIA/TIA 455 50B, Light Launch Conditions For Long-Length Graded-Index Optical Fiber Spectral Attenuation Measurements

4.25.5.2.1.3) ANSI/TIA/EIA-455-59A, Measurement of Fiber Point Discontinuities Using an OTDR

4.25.5.2.1.4) ANSI/TIA/EIA 455 60A, Measurement of Fiber or Cable Length Using an OTDR

4.25.5.2.1.5) ANSI/TIA/EIA 455 61A, Measurement of Fiber or Cable Attenuation Using an OTDR

4.25.5.2.1.6) ANSI/TIA/EIA 526 7, Optical Power Loss Measurements of Installed Singlemode Fiber Cable Plant

4.25.5.2.1.7) ANSI/TIA/EIA 526 14 A, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant

4.25.5.2.1.8) ANSI/TIA/EIA-568-B.1, Commercial Building Telecommunications Cabling Standard, Part 1, General Requirements

4.25.5.2.1.9) ANSI/TIA/EIA 568 B.3, Optical Fiber Cabling Components Standard

4.25.5.2.1.10) TIA/EIA TSB-140, Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems

4.25.5.2.1.11) ANSI/TIA/EIA-606-A, Administration Standard for Commercial Telecommunications Infrastructure, in addition to the requirements specified by Owner.

4.25.5.2.2) Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:

4.25.5.2.2.1) Manufacturer of the fiber optic cable and/or the fiber optic connectors

4.25.5.2.2.2) Manufacturer of the test equipment used for the field certification

4.25.5.2.2.3) Training organizations (e.g., BICSI, A Telecommunications Association headquarters in Tampa, Florida; ACP [Association of Cabling Professionals™] Cabling Business Institute located in Dallas, Texas).

4.25.5.3) Submittals

Contractor shall supply the following to Owner Project Manager upon request:

4.25.5.3.1) Manufacturers catalog sheets and specifications for fiber optic field-test instruments including optical loss test sets (OLTS; power meter and source), optical time domain reflectometer (OTDR) and inspection scope.

4.25.5.3.2) A schedule (list) of all optical fibers to be tested.

4.25.5.3.3) Sample test reports.

4.25.5.4) Acceptance of Test Results

4.25.5.4.1) Unless otherwise specified by the Owner Technical Contact, each cabling link shall be demonstrated via test result database to be in compliance with the test limits as specified in ANSI/TIA/EIA-568-B.1.

4.25.5.4.1.1) Optical loss testing

4.25.5.4.1.1.1) Backbone (multimode and singlemode) link

The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA/EIA-568-B.1.

4.25.5.4.1.1.1.1) Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)
4.25.5.4.1.1.1.2) Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)
4.25.5.4.1.1.1.3) Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)
4.25.5.4.1.1.1.4) Maximum allowable connector_loss = 0.75 dB
4.25.5.4.1.1.1.5) Splice_Attn (dB) = number_of_splices * splice_loss (dB)
4.25.5.4.1.1.1.6) Maximum allowable splice_loss = 0.3 dB

4.25.5.4.1.1.1.7) The values for the Attenuation Coefficient (dB/km) as listed in referenced specifications.

4.25.5.4.1.1.2) Horizontal (multimode) link

4.25.5.4.1.1.2.1) The acceptable link attenuation for a multimode horizontal optical fiber cabling system is based on the maximum 90 m (295 ft) distance.

4.25.5.4.1.1.2.2) The horizontal link may be tested using a fixed upper limit for attenuation of 2.0 dB. This value is based on the loss of two (2) connector pairs, one pair at the telecommunications outlet/connector and one pair at the horizontal cross-connect, plus 90 m (295 ft) of optical fiber cable.

4.25.5.4.1.1.2.3) A horizontal link in an Open Office Cabling network with a consolidation point may be tested using a fixed upper limit for attenuation of 2.75 dB.

4.25.5.4.1.1.3) Centralized (multimode) link

4.25.5.4.1.1.3.1) The acceptable link attenuation for a multimode centralized optical fiber cabling system is based on the maximum 300 m (984 ft) distance.

4.25.5.4.1.1.3.2) The centralized link may be tested using a fixed upper limit for attenuation of 3.3 dB. This value is based on the loss of three (3) connector pairs, one pair at the telecommunications outlet/connector, one pair at the consolidation point and one pair at the horizontal cross-connect, plus 300 m (984 ft) of optical fiber cable.

4.25.5.4.1.1.3.3) A horizontal link in an Open Office Cabling network with a consolidation point may be tested using a fixed upper limit for attenuation of 4.1 dB.

4.25.5.4.1.2) OTDR testing

4.25.5.4.1.2.1) Reflective events (connections) shall not exceed 0.75 dB.

4.25.5.4.1.2.2) Non-reflective events (splices) shall not exceed 0.3 dB.

4.25.5.4.1.3) Magnified endface inspection

4.25.5.4.1.3.1) Fiber connections shall be visually inspected for endface quality.

4.25.5.4.1.3.2) Scratched, pitted or dirty connectors shall be diagnosed and corrected.

4.25.5.4.2) All installed cabling links and channels shall be field-tested and pass the test requirements and analysis as described in this Specification. Any link or channel that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all links and channels shall be provided in the test results documentation in accordance with this Specification.

4.25.5.4.3) Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Owner.

Note: High Bandwidth applications such as 1000BASE-SX, 10GBASE-S, and FC1200 impose stringent channel loss limits. Where practical, certification shall consider loss length limits that meet maximum channel (transmitter to receiver) loss.

4.25.5.5) Optical Fiber Cable Tester Device Requirements

4.25.5.5.1) The field-test instrument shall be within the calibration period recommended by the manufacturer.

4.25.5.5.2) Optical loss test set (OLTS)

4.25.5.5.2.1) Multimode optical fiber light source
4.25.5.5.2.2) Provide dual LED light sources with central wavelengths of 850 nm (±30 nm) and 1300 nm (±20 nm)
4.25.5.5.2.3) Output power of –20 dBm minimum.
4.25.5.5.2.4) The light source shall meet the launch requirements of ANSI/EIA/TIA 455 50B, Method A. This launch condition can be achieved either within the field test equipment or by use of an external mandrel wrap (as described in clause 11 of ANSI/TIA/EIA-568-B.1) with a Category 1 light source.

4.25.5.5.3) Singlemode optical fiber light source

4.25.5.5.3.1) Provide dual laser light sources with central wavelengths of 1310 nm (±20 nm) and 1550 nm (±20 nm).
4.25.5.5.3.2) Output power of –10 dBm minimum.

4.25.5.5.4) Power Meter

4.25.5.5.4.1) Provide 850 nm, 1300/1310 nm, and 1550 nm wavelength test capability.
4.25.5.5.4.2) Power measurement uncertainty of ± 0.25 dB.

4.25.5.5.4.3) Store reference power measurement.
4.25.5.5.4.4) Save at least 100 results in internal memory.
4.25.5.5.4.5) PC interface (serial or USB).

4.25.5.5.5) Optional length measurement

4.25.5.5.5.1) It is preferable to use an OLTS that is capable of measuring the optical length of the fiber using time-of-flight techniques.

4.25.5.5.6) Optical Time Domain Reflectometer (OTDR)

4.25.5.5.6.1) Multimode OTDR
4.25.5.5.6.1.1) Wavelengths of 850 nm (± 20 nm) and 1300 nm (± 20 nm).
4.25.5.5.6.1.2) Event deadzones of 3.7 m maximum at 850 nm and 1300 nm.
4.25.5.5.6.1.3) Attenuation deadzones of 10 m maximum at 850 nm and 13 m maximum at 1300 nm.
4.25.5.5.6.1.4) Distance range not less than 2000 m.
4.25.5.5.6.1.5) Dynamic range at least 10 dB at 850 nm and 1300 nm

4.25.5.5.6.2) Singlemode OTDR
4.25.5.5.6.2.1) Wavelengths of 1310 nm (± 20 nm) and 1550 nm (± 20 nm).
4.25.5.5.6.2.2) Event deadzones of 3.5 m maximum at 1310 nm and 1550 nm.
4.25.5.5.6.2.3) Attenuation deadzones of 10 m maximum at 1310 nm and 12 m maximum at 1550 nm.
4.25.5.5.6.2.4) Distance range not less than 10000 m.
4.25.5.5.6.2.5) Dynamic range at least 10 dB at 1310 nm and 1550 nm

4.25.5.5.7) Fiber Microscope

4.25.5.5.7.1) Magnification of 200X or 400X for endface inspection.
4.25.5.5.7.2) Test equipment shall be capable of saving and reporting the endface image.

4.25.5.5.8) Integrated OLTS, OTDR and fiber microscope
4.25.5.5.8.1) Test equipment that combines into one instrument an OLTS, an OTDR and a fiber microscope may be used.

4.25.5.6) Administration

4.25.5.6.1) Administration of the documentation shall include test results of each fiber link and channel.

4.25.5.6.2) The test result information for each link shall be recorded in the memory of the field-test instrument upon completion of the test.

4.25.5.6.3) The test result records saved within the field-test instrument shall be transferred into a Microsoft Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records.

4.25.5.7) Execution of Optical Fiber Cable Testing

4.25.5.7.1) All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.
4.25.5.7.2) All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.
4.25.5.7.3) Field-test instruments shall have the latest software and firmware installed.
4.25.5.7.4) Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.
4.25.5.7.5) Fiber endfaces shall be inspected at 200X or 400X magnification. 200X magnification is suitable for inspecting multimode and singlemode fibers. 400X magnification may be used for detailed examination of singlemode fibers. Scratched, pitted or dirty connectors shall be diagnosed and corrected.
4.25.5.7.5.1) Endface images shall be recorded in the memory of the test instrument for subsequent reporting.
4.25.5.7.6) Testing shall be performed on each cabling segment (connector to connector).
4.25.5.7.7) Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the Owner's instructions.
4.25.5.7.8) Testing of the cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m in length. The test cords for OTDR testing shall be approximately 100 m for the launch cable and at least 25 m for the receive cable.
4.25.5.7.9) Optical loss testing
4.25.5.7.9.1) Backbone link
4.25.5.7.9.1.1) Multimode backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper or the equivalent method.
4.25.5.7.9.1.2) Singlemode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper or the equivalent method.
4.25.5.7.9.1.3) Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

4.25.5.7.9.1.4) Use the One Reference Jumper Method specified by ANSI/TIA/EIA-526-14A, Method B and ANSI/TIA/EIA-526-7, Method A.1 or the equivalent method. The user shall follow the procedures established by these standards or application notes to accurately conduct performance testing.

4.25.5.7.9.2) Horizontal (multimode) link

4.25.5.7.9.2.1) The horizontal optical fiber cabling link segments need to be tested at only one wavelength. Because of the short length of cabling, attenuation deltas due to wavelength are insignificant. The horizontal link shall be tested at 850 nm or 1300 nm in one direction in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper method or the equivalent method.

4.25.5.7.9.3) Centralized (multimode) link

4.25.5.7.9.3.1) The centralized optical fiber cabling link segments need to be tested at only one wavelength. Because of the short length of cabling, attenuation deltas due to wavelength are insignificant. The horizontal link shall be tested at 850 nm or 1300 nm in one direction in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper method or the equivalent method. Testing at 850 nm is recommended unless otherwise specified by the Owner.

4.25.5.7.10) OTDR Testing

4.25.5.7.10.1) Backbone, horizontal and centralized links shall be tested at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.

4.25.5.7.10.1.1) Backbone multimode: 850 nm and 1300 nm

4.25.5.7.10.1.2) Backbone singlemode: 1310 nm and 1550 nm

4.25.5.7.10.1.3) Horizontal multimode: 850 nm or 1300 nm

4.25.5.7.10.1.4) Centralized multimode: 850 nm or 1300 nm (850 nm recommended unless otherwise specified by the end user)

4.25.5.7.10.2) Each fiber link and channel shall be tested in one direction.

4.25.5.7.10.3) A launch cable shall be installed between the OTDR and the first link connection.

4.25.5.7.10.4) A receive cable shall be installed after the last link connection.

4.25.5.7.11) Magnified Endface Inspection

4.25.5.7.11.1) Fibers shall be inspected at 250X or 400X magnification. 250X magnification is suitable for inspecting multimode and singlemode fibers. 400X magnification may be used for detailed examination of singlemode fibers.

4.25.5.7.12) Length Measurement

4.25.5.7.12.1) The length of each fiber shall be recorded.

4.25.5.7.12.2) It is preferable that the optical length be measured using an OLTS or OTDR.

4.25.5.7.13) Polarity Testing

4.25.5.7.13.1) Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with subclause 10.3 of ANSI/TIA/EIA 568 B.1. The polarity of the paired duplex fibers shall be verified using an OLTS.

4.25.6) Security/Surveillance Power Cable Testing

100% of the Security/Surveillance cables in the installation shall be tested.

All conductors of the installed Security/Surveillance cable shall be tested and shall be confirmed continuous.

The installed Security/Surveillance cable shall be tested from the point of termination, to the Security/Surveillance patch panel.

4.25.7) Additional Requirements

4.25.7.1) The test results documentation shall be available for inspection by the Owner Project Manager and the Owner Technical Contact during the installation period and shall be passed to the Owner Project Manager and the Owner Technical Contact representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as built information.

4.25.7.2) Circuit IDs reported by the test instrument shall match the Cable Marking Label on the patch panel end of the tested cable, in accordance with the Cable Installation Labeling Convention, described in this Specification.

4.26) Documentation

4.26.1) Category 6 / 6A Test Results

Contractor will supply test results from test equipment for all cables that Contractor installs.

The test results information for each link shall be recorded in the electronic memory of the field tester equipment upon completion of the test.

The test results records saved by the field tester shall be transferred into a Microsoft Windows™-based database utility that allows for the maintenance, inspection, archiving, and plain-text exporting of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered (i.e., “as saved in the field-test instrument”) and that these results cannot be modified at a later time. Testers that transfer the numeric measurement data from the tester to the PC in a non-printable format in this regard offer superior protection. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.

The database for the completed job and all source tester data files shall be stored and delivered on CD-ROM prior to Owner acceptance of the tested cable. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.

A paper hard copy shall be submitted, containing a test results summary of each installed link.

4.26.1.1) Hard Copy

A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information:

4.26.1.1.1) The identification of the link in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.1.1.2) The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number
4.26.1.1.3) The date and time the test results were saved in the memory of the tester

4.26.1.2) Database General Information

General Information to be provided in the electronic database with the test results information for each link:

4.26.1.2.1) The identification of the customer site as specified by Owner
4.26.1.2.2) The identification of the link in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.1.2.3) The overall Pass/Fail evaluation of the link-under-test
4.26.1.2.4) The name of the standard selected to execute the stored test results
4.26.1.2.5) The cable type and the value of NVP used for length calculations
4.26.1.2.6) The date and time the test results were saved in the memory of the tester
4.26.1.2.7) The brand name, model and serial number of the tester
4.26.1.2.8) The identification of the tester interface
4.26.1.2.9) The revision of the tester software and the revision of the test standards database in the tester
4.26.1.2.10) The test results information must contain information on each of the required test parameters that are listed in Section 0 (“Performance Test Parameters”) and as further detailed below under paragraph 4.26.1.3) (“Database Detailed Information”)

4.26.1.3) Database Detailed Information

The detailed test results data to be provided in the electronic database for each tested Category 6 / 6A link must contain the following information:

For each of the frequency-dependent test parameters, the minimum test results documentation shall be stored for each wire-pair or wire-pair combination as observed from each end of the link. The minimum test results documentation for each test parameter shall be in compliance with the information in Section 0 (“Performance Test Parameters”)

4.26.1.3.1) The name of the test limit selected to execute the stored test results
4.26.1.3.2) The name of the personnel performing the test
4.26.1.3.3) The date and time the test results were saved in the memory of the tester
4.26.1.3.4) The manufacturer, model and serial number of the field-test instrument
4.26.1.3.5) The version of the test software and the version of the test limit database held within the test instrument
4.26.1.3.6) Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest foot and the test limit value
4.26.1.3.7) Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value
4.26.1.3.8) Delay Skew**:** Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value
4.26.1.3.9) Insertion Loss (Attenuation): Minimum test results documentation as explained in Section 0 (“Performance Test Parameters”) for the wire pair with the worst insertion loss
4.26.1.3.10) Return Loss: Minimum test results documentation as explained in Section 0 (“Performance Test Parameters”). Identify as detected from each end of the link, the wire pair that exhibits the worst-case margin and the wire pair with the worst RL. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
4.26.1.3.11) NEXT, ELFEXT, ACR: Minimum test results documentation as explained in Section 0 (“Performance Test Parameters”). Identify as measured from each end of the link, the wire pair combination that exhibits the worst case margin and the wire pair combination that delivers the worst case value. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
4.26.1.3.12) PSNEXT, PSELFEXT, and PSACR: Minimum test results documentation as explained in Section 0 (“Performance Test Parameters”). Identify as detected from each end of the link, the wire pair that exhibits the worst-case margin and the wire pair with the worst value. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.
4.26.1.3.13) Link length, propagation delay, and delay skew shall also be reported for each wire pair as well as the test limit for each of these parameters.

4.26.2) Telecommunications Feeder Cable Test Results

Contractor will supply test results from test equipment for all telecommunications feeder cables that Contractor installs.

The test results information for each pair of the installed telecommunications feeder cable shall be recorded in the electronic memory of the field tester equipment upon completion of the test.

The test results records saved by the field tester shall be transferred into a Microsoft Windows™-based database utility that allows for the maintenance, inspection, archiving, and plain-text exporting of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered (i.e., “as saved in the field-test instrument”) and that these results cannot be modified at a later time. Testers that transfer the numeric measurement data from the tester to the PC in a non-printable format in this regard offer superior protection. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.

The database for the completed job and all source tester data files shall be stored and delivered on CD-ROM prior to Owner acceptance of the tested cable. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.

A paper hard copy shall be submitted, containing a test results summary of each installed pair.

4.26.2.1) Hard Copy

A paper copy of the test results shall be provided that lists all the pairs that have been tested with the following summary information:

4.26.2.1.1) The identification of the pair in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.2.1.2) The overall Pass/Fail evaluation of the pair-under-test
4.26.2.1.3) The date and time the test results were saved in the memory of the tester

4.26.2.2) Database General Information

General Information to be provided in the electronic database with the test results information for each pair:

4.26.2.2.1) The identification of the customer site as specified by Owner
4.26.2.2.2) The identification of the pair in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.2.2.3) The overall Pass/Fail evaluation of the link-under-test
4.26.2.2.4) The name of the standard selected to execute the stored test results
4.26.2.2.5) The cable type
4.26.2.2.6) The date and time the test results were saved in the memory of the tester
4.26.2.2.7) The brand name, model and serial number of the tester
4.26.2.2.8) The identification of the tester interface
4.26.2.2.9) The revision of the tester software and the revision of the test standards database in the tester
4.26.2.2.10) The test results information must contain information on each of the required test parameters as detailed below under “Database Detailed Information”

4.26.2.3) Database Detailed Information

The detailed test results data to be provided in the electronic database for each tested Category 3 pair must contain the following information:

For each of the frequency-dependent test parameters, the minimum test results documentation shall be stored for each wire-pair or wire-pair combination as observed from each end of the pair. The minimum test results documentation for each test parameter shall be in compliance with TIA568-B specification for Category 3 cable.

4.26.2.3.1) The name of the test limit selected to execute the stored test results
4.26.2.3.2) The name of the personnel performing the test
4.26.2.3.3) The date and time the test results were saved in the memory of the tester
4.26.2.3.4) The manufacturer, model and serial number of the field-test instrument
4.26.2.3.5) The version of the test software and the version of the test limit database held within the test instrument
4.26.2.3.6) Insertion Loss (Attenuation)
4.26.2.3.7) Return Loss: Identify as detected from each end of the pair, the wire pair that exhibits the worst-case margin and the wire pair with the worst RL. Each reported case shall include the frequency at which it occurs as well as the test limit value at this frequency.

4.26.3) Fiber-optic Cable Test Results

Contractor will supply test results from test equipment for all fiber-optic cables that Contractor installs.

The test results information for each terminated or fused strand shall be recorded in the electronic memory of the field tester equipment upon completion of the test.

The test results records saved by the field tester shall be transferred into a Microsoft Windows™-based database utility that allows for the maintenance, inspection, archiving, and plain-text exporting of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered (i.e., “as saved in the field-test instrument”) and that these results cannot be modified at a later time. Testers that transfer the numeric measurement data from the tester to the PC in a non-printable format in this regard offer superior protection. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.

The database for the completed job and all source tester data files shall be stored and delivered on CD-ROM prior to Owner acceptance of the tested cable. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.

A paper hard copy shall be submitted, containing a test results summary of each strand.

4.26.3.1) Hard Copy

A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information:

4.26.3.1.1) The identification of the strand in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.3.1.2) The overall Pass/Fail evaluation of the strand-under-test
4.26.3.1.3) The date and time the test results were saved in the memory of the tester

4.26.3.2) Database General Information

General Information to be provided in the electronic database with the test results information for each link:

4.26.3.2.1) The identification of the customer site as specified by Owner
4.26.3.2.2) The identification of the pair in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.3.2.3) The overall Pass/Fail evaluation of the strand-under-test
4.26.3.2.4) The name of the standard selected to execute the stored test results
4.26.3.2.5) The cable type
4.26.3.2.6) The date and time the test results were saved in the memory of the tester
4.26.3.2.7) The brand name, model and serial number of the tester
4.26.3.2.8) The identification of the tester interface
4.26.3.2.9) The revision of the tester software and the revision of the test standards database in the tester
4.26.3.2.10) The test results information must contain information on each of the required test parameters as detailed below under “Database Detailed Information”

4.26.3.3) Database Detailed Information

Detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information:

4.26.3.3.1) The identification of the customer site as specified by Owner
4.26.3.3.2) The name of the test limit selected to execute the stored test results
4.26.3.3.3) The name of the personnel performing the test
4.26.3.3.4) The date and time the test results were saved in the memory of the tester
4.26.3.3.5) The manufacturer, model and serial number of the field-test instrument
4.26.3.3.6) The version of the test software and the version of the test limit database held within the test instrument
4.26.3.3.7) Circuit ID - as reported by the test instrument and matching the label on test tested cable, in accordance with the Cable Installation Labeling Convention, described in this Specification
4.26.3.3.8) The fiber strand identification number
4.26.3.3.9) The length for each optical fiber
4.26.3.3.10) Optionally the index of refraction used for length calculation when using a length capable OLTS
4.26.3.3.11) Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
4.26.3.3.12) Test results to include OTDR link and channel traces and event tables at the appropriate wavelength(s).
4.26.3.3.13) The length for each optical fiber as calculated by the OTDR.
4.26.3.3.14) The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements
4.26.3.3.14.1) A picture or image of each fiber end-face
4.26.3.3.15) A pass/fail status of the end-face based upon visual inspection.

Part 5: Documentation

5) **As-Built Documentation**

Contractor shall provide as-built documentation in electronic format, describing all work performed. As-built documentation shall follow apparent documentation standards and formats of existing data wiring documentation and building plans, submitted to Contractor by Owner.

5.1) Circuit Endpoint Table

Contractor shall submit a completed “Circuit Endpoint Table.xls” document, entering as-built labeling information for 100% of installed cables into this Microsoft Excel document. A blank “Circuit Endpoint Table.xls” form shall be provided to Contractor by Owner upon request.

Contractor shall submit completed spreadsheet to Owner as both electronic document (Microsoft Excel spreadsheet), and as hard-copy.

5.2) As-Built Drawings

Contractor shall provide a full set of as-built drawings in electronic format as a Microsoft Visio ~~11 (Visio 2003~~ document, in file format of most recent commercially-available version of Microsoft Visio.

As-built drawings shall convey an accurate depiction of the entire installation superimposed on a drawing of the building. As-built drawings must be to scale.

All edits and additions by Contractor shall be placed in a new layer, which shall have a name clearly identifying Contractor name, and date of job completion.

The as-built drawings shall include, but shall not be limited to, the following information for all materials installed by Contractor and for all existing materials used by Contractor:

5.2.1) Inside Service Plant (ISP) drawings, depicting all installed materials, as well as any existing materials utilized, along with building envelope, walls, and features. These shall include, but not be limited to:

5.2.1.1) Station outlet location and label
5.2.1.2) Details of cable path
5.2.1.3) Locations of cable termination points
5.2.1.4) Locations of pull boxes
5.2.1.5) Locations and diameter of conduits/sleeves
5.2.1.6) Locations and manufacturer/model number of raceway
5.2.1.7) Locations of penetrations and installed firestopping
5.2.1.8) Block diagrams
5.2.1.9) Frame and cable labeling
5.2.1.10) Locations of cabinets/racks
5.2.1.11) Equipment room layouts and frame installation details

5.2.2) Outside Service Plant (OSP) drawings, depicting all installed materials, as well as any existing materials utilized, along with campus building envelopes and landmarks. This shall include, but not be limited to:

5.2.2.1) Photographic aerial image of campus or accurate plan that includes:
5.2.2.1.1) Label/name of each utilized or installed manhole, handhole, and pole as per existing documentation or else as directed by Owner Technical Contact,
5.2.2.1.2) Label/name of each utilized or installed manhole any label evident in the utilized manhole or on its cover
5.2.2.1.3) Precise locations of each utilized manhole, handhole, and pole, as determined by the Global Positioning System (GPS), expressed as longitude and latitude in DMS (degrees◦minutes' seconds"), and accurate to one-hundredth of a minute.
5.2.2.1.4) Location of any trench with type of:
5.2.2.1.4.1) Conduit(s) Installed
5.2.2.1.4.2) Backfill(s) Used
5.2.2.1.5) Location(s) of any Conduit(s) used

5.2.2.2) Cable schematic diagram, with:
5.2.2.2.1) Label/name of each utilized or installed manhole, handhole, and pole as per existing documentation or else as directed by Owner Technical Contact,
5.2.2.2.2) Label/name of each utilized or installed manhole any label evident in the utilized manhole or on its cover
5.2.2.2.3) Precise locations of each utilized manhole, handhole, and pole, as determined by the Global Positioning System (GPS), expressed as longitude and latitude in DMS (degrees◦minutes' seconds"), and accurate to one-hundredth of a minute.

5.2.2.2.4) Measured pull distances between manholes, as evident from markings on installed pull tape and/or cable jacket
5.2.2.2.5) The type of cable that was installed between manholes, handholes and poles. e.g. 24-strand-SM-fiber, OSP-CAT6, etc., etc.
5.2.2.2.6) The cable labels installed on ends of cables shown

5.2.2.3) Manhole fold-out drawings for any installed manhole(s), and for any manhole(s) in which splice enclosure has been installed

5.2.3) The as built drawings shall also include accurate depiction of all field-directed changes made up to construction completion. These shall include, but not limited to:
5.2.3.1) field-directed changes to pull schedule
5.2.3.2) field-directed changes to cross connect and patching schedule
5.2.3.3) horizontal cable routing changes
5.2.3.4) backbone cable routing or location changes
5.2.3.5) associated detail drawings

5.3) Firestopping Locations

Contractor shall provide a table of as-built firestopping locations in Microsoft Excel format as in the following example:

Example:

	A	B	C	D
1	**Location**	**Description**	**Manufacturer**	**Material**
2	LI1005C-FL01	Above Cable tray	Hilte	Intumescent putty
3	LI1005C-FL02	Around 4" Conduit	Hilte	Mortar
4	LI1005C-FL03	Inside 4" conduit	Hilte	Vermiculite Pillow
…				
…				
…				
37	LI0003F-PP01-22	3" Cabinet penetration	PRC-DeSoto	PR-855 Chase Foam

5.4) Submission of Manufacturer Warranty Information

Contractor shall submit Manufacturer Warranty documents on installed cable plant upon completion of installation. Warranty documents must state specific terms of Warranty, including:

5.4.1) Start date
5.4.2) Length of Warranty (years)
5.4.3) Contact information
5.4.4) What is Covered
5.4.5) Exclusions

5.5) Punch Lists

Owner Project Manager and Owner Technical Contact shall inspect all work with Contractor at a punch list inspection tours, to take place as determined by Owner Project Manager.

Additional punch list inspection tours shall be performed as deemed necessary by Owner Project Manager, whereby prior punch list items shall be inspected, and additional punch list items may be generated.

The punch lists shall be conveyed in writing by Owner Project Manager to Owner Technical Contact, and to Contractor.

Contractor shall provide all materials and labor to repair, replace, or complete each punch list item that is within the Scope of Work.

Contractor shall respond to all punch list items in writing, either by stating that the item has been addressed/completed or by claiming that the item is outside of the Scope of Work.

Final payment shall not be released by Owner until after such a time that all punch list items have been completed to the satisfaction of Owner Project Manager and Owner Technical Contact.

5.6) Unused materials

At completion of work, Contractor shall deliver to Owner Technical Contact any materials of significant value that were included in Contractor's cost quotation/proposal for the work, but neither delivered, installed, nor credited by Contractor to Owner.

This shall include, but not be limited to:

5.6.1) Spooled/reeled/boxed copper cable greater than 150' in length
5.6.2) Unused or trimmed fiber-optic cable greater than 1000' in length
5.6.3) Unused jacks and faceplates
5.6.4) Unused patch panels
5.6.5) Unused patch cables
5.6.6) Unused racks/cabinets
5.6.7) Unused cable management
5.6.8) Unused conduit, raceway and cable tray, greater than 5' in length
5.6.9) Unused conduit, raceway, and cable tray fittings
5.6.10) Unused firestopping
5.6.11) Unused wireless access point brackets/enclosures

Part 6: Scope of Work

6) Scope of Work

Contractor shall supply all necessary parts and labor for installation of cabling and accessories to support data/telephone, Audio-visual, and security systems as described herein.

6.1) General

6.1.1) Contractor shall furnish and install cables, terminals, connectors, patch panels, and miscellaneous hardware required for delivery of a complete and working cable plant as described herein.

6.1.2) Contractor shall furnish and install raceway, duct, conduit, J-hooks, straps, and cable tray to supplement existing pathways where necessary in order to perform the scope of work described herein.

6.1.3) Contractor shall provide for testing of the installed cabling systems in the scope of work described herein, and submit results to Owner.

6.1.4) Contractor shall provide as-built documentation of the installed cabling systems in the scope of work described herein, and submit documentation to Owner.

6.1.5) Data/Telecommunications Cabling System

Installed Category 6 / 6A system and components shall support 100BASE-TX Ethernet as per IEEE 802.3u, 1000BASE-T Ethernet as per IEEE 802.3ab, 1000BASE-TX Ethernet as per TIA-854, 2.5GBASE-T and 5GBASE-T Ethernet as per IEEE 802.3bz, 10GBASE-T Ethernet as per IEEE 802.3an, Voice-Over-IP telephony (VOIP) as per TIA-TR41, digital telephony as per TIA-810-B, analog telephony as per TIA 470-C, and Power over Ethernet as per the IEEE 802.3af, IEEE802.3at, and IEEE802.3bt standards.

6.1.6) Fiber-optic Cabling

The fiber-optic portion of the Data/Telecommunications Cabling System shall support 1000BASE-LX as per IEEE 802.3 Clause 38, 1000BASE-X as per IEEE 802.3z, and10GBASE-LR as per IEEE 802.3ae.

6.2) Patch Cables

6.2.1) Category 6 Booted Patch Cables

Contractor shall supply (furnish only) a number of Category 6 booted patch cables equal to twice the total number of Category 6 outlets installed.

Contractor shall supply (furnish only) a number of Category 6 booted patch cables equal to twice the total number of Category 6 outlets installed.

Patch cables shall be shipped to Owner Project Manager in boxes, and shall be sized as follows:

6.2.1.1) All (100%) of the total number of Category 6 booted patch cables supplied shall be five (5) feet in length
6.2.1.2) One quarter (25%) of the total number of Category 6A booted patch cables supplied shall be six inches in length
6.2.1.3) One quarter (25%) of the total number of Category 6A booted patch cables supplied shall be one foot in length

6.2.1.4) One quarter (25%) of the total number of Category 6A booted patch cables supplied shall be two feet in length

6.2.1.5) One quarter (25%) of the total number of Category 6A booted patch cables supplied shall be four feet in length

6.2.2) Fiber-optic Patch Cables

Contractor shall supply (furnish only) _____ (__) duplex single-mode fiber-optic patch cables.

Duplex single-mode fiber-optic patch cables shall be shipped to Owner Project Manager in boxes, and shall be two meters in length.

6.3) Data/telecommunications Closet

Supply and install the following components in all specified data/telecommunications closets.

Prepare data/telecommunications closets for installation of cables and equipment.

Placement of installed materials in data/telecommunication closets shall be directed by Owner Technical Contact.

6.3.1) Racks/Cabinets

Provide and install ____ ____ in data/telecommunications closet _____.

Provide and install vertical cable management for racks as per this Specification.

6.3.2) Ladder Cable Tray

Provide and install 20’ of ladder cable tray in data/telecommunications closet _____.

Provide and install cable tray waterfall as per this Specification.

6.3.3) Plywood Backboard

Provide and install ¾” x 4’ x 8’ fire-rated plywood backboard and steel mounting brackets in data/telecommunications closet _____.

6.4) Main Pathway

Stud grommets shall be used as cable support as appropriate on hallway ceiling of School of Art and Design Building, when main pathway is not available.

J-hooks shall be used as cable support as appropriate in all other places when main pathway is not available.

Main pathway is to be installed as follows:

6.4.1) Basket Tray

Not within this scope of work.

6.4.2) Core Drilled Penetrations

Not within this scope of work.

6.4.3) Riser Construction

Not within this scope of work.

6.4.4) Other

Not within this scope of work.

6.5) Fiber-Optic Cable

6.5.1) Fiber-Optic Cable

Not within this scope of work.

6.5.2) Armored Fiber-Optic Cable

Not within this scope of work.

6.5.3) Fiber-Optic Patch Panel

Utilize proper dust-protected environment. Provide and install CCH-02U fiber-optic patch panel in _____. Terminate twelve strands of fiber in CCH-02U fiber-optic path panel.

6.5.4) Fusion Splicing

Utilize proper dust-protected environment, lift and open existing _____ splice tube.

Fusion-splice total of twelve strands of new fiber to existing fiber-optic cables in _____ splice tube, as per instructions of Owner Technical Contact.

6.6) Category 3 Telecommunications Feeder Cable and Patch Panel

6.6.1) Telecommunications Feeder Cable

Supply and install a 100-pair Category 3 telecommunications feeder cable between ____ and _____.

6.6.2) Telecommunications Feeder Patch Panels and Cross-Connect Blocks

Supply and install 96-port RJ11 telecommunications feeder patch panel in _____.

Supply and install 100-pair 66M cross-connect punch-down block in _____ as directed by Owner Technical Contact.

6.6.3) Termination

Terminate 96-pairs of telecommunications feeder cable on 110 IDC blocks on rear of new telecommunications feeder patch panel in _____.

Terminate all pairs of telecommunications feeder cable on 66M cross-connect punch-down blocks at telecommunications distribution frame as directed by the Owner Technical Contact in _____.

6.7) Category 6 / 6A Cable Installation

Supply and install a grand total of ____ Category 6 cables/outlets

6.7.1) Workstation Outlets

Supply and install a total of ____ Category 6 data/telecommunications outlets for workstations.

See attached diagram(s) for port locations.

6.7.1.1) Supply and install a total of ___ Category 6 data/telecommunications outlets for workstations in the _____ building (__).
6.7.1.2) Supply and install a total of ___ Category 6A data/telecommunications outlets for workstations in the _____ building (__).

6.7.2) Wireless access point outlets

Supply and install a total of ___4 Category 6A cables for wireless access point outlets in __AD1016_as per diagram. Each wireless access point outlet location shall have two cables run to it, with 30' of slack on each cable coiled near destination. Place outlets in surface-mount box above ceiling in location as per diagram.

NOTE: ports shall be labeled using equipment type "MJ" (faceplate), as described in following list:

6.7.2.1) _____
6.7.2.2) _____

6.7.3) Spare Cables

Supply and install a total of _____ spare Category 6A cables in ceilings, coiled w/ 50' slack on each cable. Spare cables shall be left un-terminated in ceiling of specified location. Spare cables shall be terminated in data/telecommunications closet patch panel, and shall not be tested.

Spare cable jacks shall be referred to as "-SPAREn" on patch panel and cable labels, where "n" is a numeric index, e.g. "LI0009B-SPARE1", "LI0009B-SPARE2", etc.

6.7.3.1) Install two "spare" Category 6A cables to end of _____ hallway, coil in _____ ceiling.

6.8) Category 6 Patch panels

Supply and install grand total of (_____) Category 6 Patch Panel in closet/locations:

6.8.1) ___ (__) in _____
6.8.2) ___ (__) in _____

6.9) Category 6 Patch panels

Supply and install grand total of (___4___) Category 6A Patch Panel in closet/locations:

6.9.1) ___ (__) in _____
6.9.2) ___ (__) in _____

6.10) Wireless Access Point Mounting Brackets

Provide and install Wireless Access Point Mounting Brackets of the following types in the specified location. Precise location for mounting shall be field-directed, with approval by Owner Technical Contact.

Wireless Access Points and Suspended-Ceiling-Mount Wireless Access Point Mounting Brackets shall be provided by Owner. Contractor shall mount Wireless Access Points and connect Wireless Access Points to designated wireless access point data outlets after brackets are installed:

6.10.1) Suspended-Ceiling-Mount Wireless Access Point Mounting Bracket

6.10.1.1) _____

6.10.2) Indoor Wall-Mount Wireless Access Point Mounting Bracket

6.10.2.1) _____

6.11) Removal of Abandoned Category-5, Category-5e, and Category 6 Cable

Abandoned Category-5, Category-5e, and Category 6 cable shall be removed as per NFPA/NEC code.

6.11.1) Coordinate cutover to newly-installed cable with Owner Technical Contact, following completion of installation.

6.11.2) Following successful cutover to newly-installed cable, remove all abandoned cabling that was replaced by the newly-installed Category 6 cable

.

6.11.3) Not within this scope of work.

6.12) Attachments

See attached diagrams and documentation for further description of Scope of Work.

*** **END OF DOCUMENT ***

SUNY PURCHASE COLLEGE

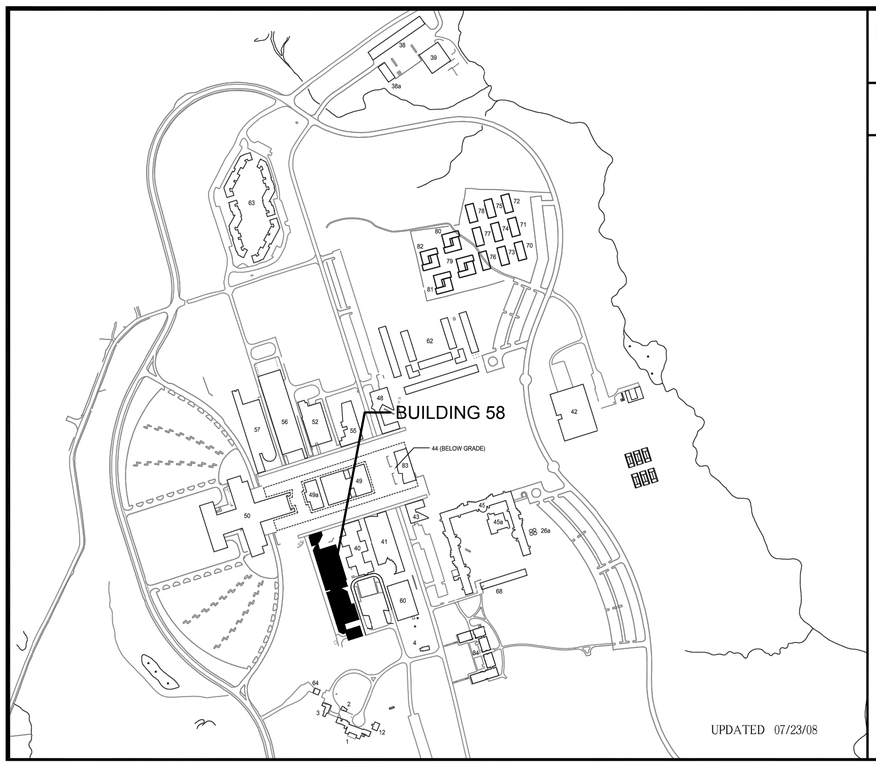
VISUAL ARTS PERCEPTION LAB RENOVATION

735 ANDERSON HILL RD.

PURCHASE, NY 10577

SUNY PURCHASE PROJECT NUMBER: SU-021119

ISSUED FOR: BID, FEBRUARY 11, 2019



VACINITY MAP

Purchase College
STATE UNIVERSITY OF NEW YORK

Campus Owned Facilities

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1. ADMINISTRATION BUILDING
2. BUSINESS ANNEX
3. CAPITAL FACILITIES PLANNING
4. GATE HOUSE
12. HUMAN RESOURCES BUILDING
26a. SILO
36. BEECHWOOD ESTATE (not shown)
37. BEECHWOOD GARAGE (not shown)
38. SERVICE GROUP - FACILITIES ADMIN.
38a. AUTO REPAIR SHOP
39. HEATING PLANT
40. NEUBERGER MUSEUM
41. HUMANITIES BUILDING
42. PHYSICAL EDUCATION BUILDING
43. CAMPUS CENTER SOUTH
44. MECHANICAL SERVICES
45. DORMITORY STAGE XIV
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62. APARTMENT HOUSING, PHASE I
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68. MODULAR DORM - THE OUTBACK
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80. ALUMNI VILLAGE 11
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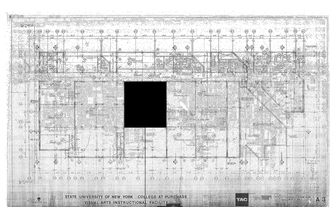
83. STUDENT SERVICES BUILDING
84. NEW RESIDENCE HALL

THE PROJECT SHALL CONSIST OF A RENOVATION OF AN EXISTING PERCEPTION LAB AND MAKE IT ACOUSTICALLY SOUND. WORK SHALL INCLUDE THE REMOVAL OF EXISTING STUD SOFFIT'S AND METAL CEILING PANEL. EXISTING LIGHT FIXTURES AND MEZZANINE. NEW CONSTRUCTION SHALL INCLUDE RESILIENT HUNG GYP. BD. SOFFITS AS WELL AS AN ADA RAMP AND NEW STAIRS, WITH SOUND RESISTANT WALL FOR A NEW GALLERY SPACE.

PROJECT DESCRIPTION



LOCUS MAP

OWNER:
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735 ANDERSON HILL RD
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PM: MUNEEZA ISMAIL
TEL:
E-MAIL: muneeza.ismail@purchase.edu

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E-MAIL: cmilliard@phasezerodesign.com

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PM: FRANK J. TIERNO
TEL: (914) 332-7658 x105
EMAIL: ftierno@collado-eng.com

ACOUSTICAL ENGINEER:
COTE ACOUSTICAL CONSULTING LLC
PM: MARC G. COTE
TEL: (860) 966-7350
E-MAIL:marccote160@yahoo.com

PROJECT TEAM

DRAWING LIST

SHEET #:	DRAWING NAME:	ISSUED FOR:	ISSUE DATE:
G000	TITLE PAGE	BID	02.11.2019
G001	SYMBOLS & ABBREVIATIONS	BID	02.11.2019
G002	GENERAL NOTES	BID	02.11.2019
G003	GENERAL NOTES	BID	02.11.2019
G101	FIRST FLOOR CODE & REFERENCE PLAN	BID	02.11.2019
ARCHITECTURAL			
AD101	DEMOLITION FLOOR PLAN	BID	02.11.2019
A101	CONSTRUCTION AND FINISH PLAN	BID	02.11.2019
A201	REFLECTED CEILING PLAN	BID	02.11.2019
A501	WALL TYPES / DOOR DETAILS / DOOR SCHEDULE	BID	02.11.2019
A502	DOOR SPECIFICATIONS	BID	02.11.2019
A601	RAMP DETIALS	BID	02.11.2019
A602	RAMP / STAIR / AND SOFFIT DETAILS	BID	02.11.2019
A701	INTERIOR ELEVATIONS	BID	02.11.2019
FIRE ALARM			
FA-001	FIRE ALARM SYMBOLS LIST, GENERAL NOTES, MOUNTING DETAIL, RISER DIAGRAM AND DRAWING LIST	BID	02.11.2019
FAD-101	FIRE ALARM DEMOLITION PLAN	BID	02.11.2019
FA-101	FIRE ALARM PLAN	BID	02.11.2019
FA-200	FIRE ALARM VISUAL ARTS BUILDING NORTH PLAN	BID	02.11.2019
FA-300	FIRE ALARM SPECIFICATIONS	BID	02.11.2019
MECHANICAL			
M-001	MECHANICAL SYMBOLS LIST, ABBREVIATIONS, GENERAL NOTES AND DRAWING LIST	BID	02.11.2019
M-100	MECHANICAL DEMOLITION EXISTING PLAN	BID	02.11.2019
M-101	MECHANICAL CONSTRUCTION PLAN	BID	02.11.2019
M-200	MECHANICAL SCHEDULES AND DETAILS	BID	02.11.2019
M-300	MECHANICAL SPECIFICATIONS	BID	02.11.2019
ELECTRICAL			
E-001	ELECTRICAL ABBREVIATIONS GENERAL NOTES, LIGHTING SCHEDULE, CODE COMPLIANCE AND DRAWING LIST	BID	02.11.2019
E-002	ELECTRICAL VISUAL ARTS BUILDING NORTH FIRST FLOOR PLAN	BID	02.11.2019
E-003	ELECTRICAL VISUAL ARTS BUILDING NORTH SECOND FLOOR PLAN	BID	02.11.2019
ED-101	ELECTRICAL DEMOLITION PLAN	BID	02.11.2019
ED-102	ELECTRICAL LIGHTING DEMOLITION PLAN	BID	02.11.2019
E-101	ELECTRICAL POWER/DATA PLAN	BID	02.11.2019
E-102	ELECTRICAL LIGHTING PLAN	BID	02.11.2019
E-200	ELECTRICAL PANEL SCHEDULES	BID	02.11.2019
E-300	ELECTRICAL SPECIFICATIONS	BID	02.11.2019

INDEX OF DRAWINGS

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT
MATTHEW D WITTMAN
37334
STATE OF NEW YORK

02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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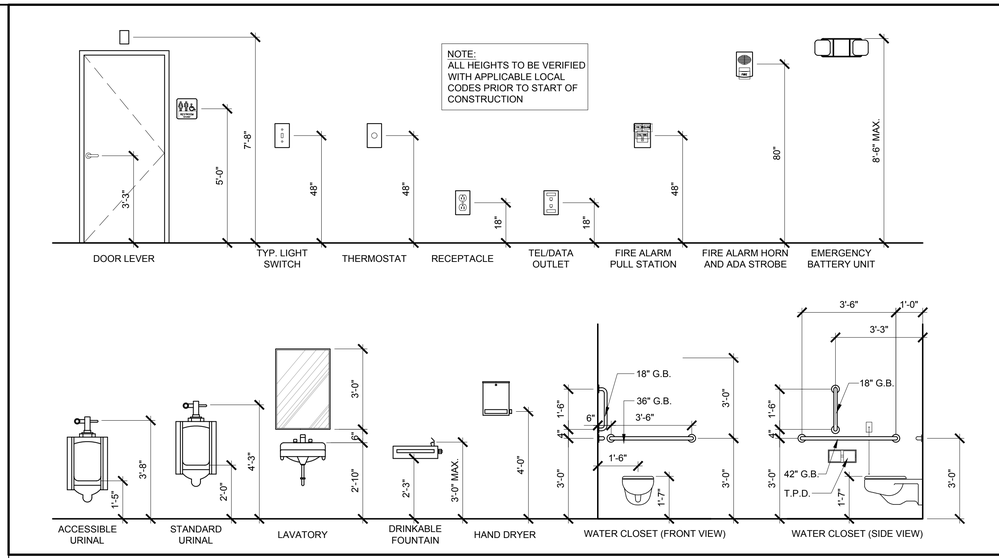
DRAWING NAME
TITLE PAGE

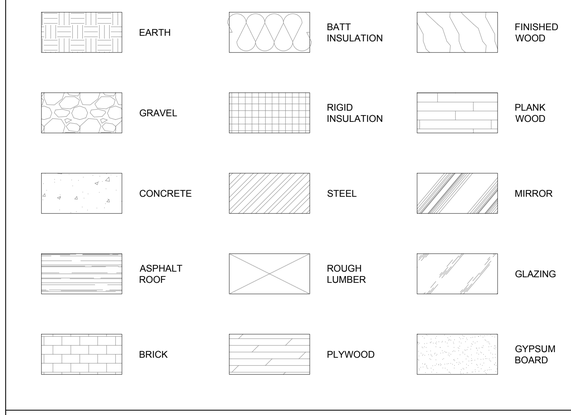
DRAWING NO.
G000

ABBREVIATIONS

A/C.	AIR CONDITIONING
ACT.	ACCOUSTIC(AL)
AD.	AREA DRAIN
ADJ.	ADJACENT
AFF.	ABOVE FINISHED FLOOR
ALT.	ALTERNATE
ALUM	ALUMINUM
APPROX.	APPROXIMATE
ARCH.	ARCHITECT(URAL)
∠	ANGLE
@	AT
BD.	BOARD
BET.	BETWEEN
BIT	BITUMINOUS
BLDG.	BUILDING
BLK.	BLOCKING
BM.	BEAM
BOT.	BOTTOM
BR.	BEDROOM
BRG.	BEARING
BRKT.	BRACKET
BSMT.	BASEMENT
CAB.	CABINET
CPT.	CARPET
CER.	CERAMIC
CIP.	CAST-IN-PLACE
CIR.	CIRCLE
CJ.	CONTROL JOINT
CLG.	CEILING
CLO.	CLOSET
CLR.	CLEAR
CL.	CENTER LINE
CMT.	CERAMIC MOSAIC TILE
CMU	CONCRETE MASONRY UNIT
CO.	CLOSE OUT
COL.	COLUMN
COMB.	COMBINATION
CONC.	CONCRETE
CONST.	CONSTRUCTION
CONT.	CONTINUE
CORR.	CORRIDOR
CORRUG.	CORRUGATED
CRS.	COURSE
CSK	COUNTERSINK
CTR.	CENTER
CU.	CUBIC
DR.	DRAIN
DBL.	DOUBLE
DEM.	DEMOLITION
DEP.	DEPRESS(ED)(ION)
DET.	DETAIL
DIAG.	DIAGONAL
DIA.	DIAMETER
DIM.	DIMENSION
DIV.	DIVISION
DL.	DEAD LOAD
DMPFG.	DAMPPROOFING
DN.	DOWN
DS.	DOWNSPOUT
DWG.	DRAWING
DWR.	DRAWER
EA.	EACH
EL.	ELEVATION
ELEC.	ELECTRIC(AL)
EMER.	EMERGENCY
ENC.	ENCLOSE(URE)
ENT.	ENTRANCE
EQ.	EQUAL
EQUIP.	EQUIPMENT
EST.	ESTIMATE
EWC.	ELECTRIC WATER COOLER
EXC.	EXCAVATE
EXH.	EXHAUST
EXIST.	EXISTING
EXPN.	EXPANSION
EXT.	EXTERIOR
FAST.	FASTEN(ER)
FGL.	FIBERGLASS
FIN.	FINISH(ED)
FLR.	FLOOR
FLEX.	FLEXIBLE
FLG.	FLASHING
FLUR.	FLUORESCENT
FND.	FOUNDATION
FP.	FIRE PROOFING
FT. OR '	FOOT, FEET
FTG.	FOOTING
FUR.	FURRED, FURRING
FXT.	FIXTURE
GA.	GAUGE, GAGE
GALV.	GALVANIZED
GC.	GENERAL CONTRACTOR
GKT.	GASKET
GL.	GLASS, GLAZING
GR.	GRADE(ING)
GVL.	GRAVEL
GWB.	GYPSUM WALLBOARD
GYP.	GYPSUM
HC.	HOLLOW CORE
HDW.	HARDWARE
HM.	HOLLOW METAL
HOR.	HORIZONTAL
HP.	HORSEPOWER
HR.	HOUR
HT.	HEIGHT
HTR.	HEATER
HVAC	HEATING VENTILATION AIR CONDITIONING
HWD.	HARDWOOD
ID.	INSIDE DIAMETER
IN. OR "	INCH
INCL.	INCLUDE
INSUL.	INSULATE(D), INSULATION
INT.	INTERIOR
INTM.	INTERMEDIATE
INV.	INVERT
JST.	JOIST
JAN.	JANITOR
JB.	JUNCTION BOX
JC.	JANITOR'S CLOSET
JT.	JOINT
KO.	KNOCK OUT
LAM.	LAMINATE
LAV.	LAVATORY
LB.	POUND
LIN.	LINEAR
LL.	LIVE LOAD
LT.	LIGHT
LVR.	LOUVER
LW.	LIGHTWEIGHT
MACH.	MACHINE
MAS.	MASONRY
MAX.	MAXIMUM
MBR.	MEMBER
MECH.	MECHANIC(AL)
MED.	MEDIUM
MEMB.	MEMBRANE
MTL.	METAL
MFR.	MANUFACTURER
MH.	MANHOLE
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MLD.	MOLDING
MO.	MASONRY OPENING
MOD.	MODULAR
MOV.	MOVEABLE
MR.	MOISTURE RESISTANT
MRL.	MINERAL
MTD.	MOUNTED
MTG.	MEETING
MATL.	MATERIAL
MULL.	MULLION
NA.	NOT APPLICABLE
NAT.	NATURAL
NIC.	NOT IN CONTRACT
NOM.	NOMINAL
NTS.	NOT TO SCALE
OC.	ON CENTER
OD.	OUTSIDE DIAMETER
OFF.	OFFICE
OPG.	OPENING
OPP.	OPPOSITE
OZ.	OUNCE
PC.	PRECAST
PCF.	POUNDS PER CUBIC FOOT
PERF.	PERFORATED
PERP.	PERPENDICULAR
PK.	PARKING
PL.	PLATE
PLAS.	PLASTER
PLF.	POUNDS PER LINEAR FOOT
PLS.	PLASTIC.
PNL.	PANEL
PNT.	PAINT(ED)
POL.	POLISHED
PR.	PAIR
PREFAB.	PREFABRICATED
PROJ.	PROJECTING, PROJECT
PROT.	PROTECTION
PSF.	POUNDS PER SQUARE FOOT
PSI.	POUNDS PER SQUARE INCH
PT.	POINT OR PRESSURE TREATED
PTN.	PARTITION
PVC.	POLYVINYL CHLORIDE
PVMT.	PAVEMENT
%	PERCENT
QT.	QUARRY TILE
R.	RISER
RAD.	RADIUS
RECEPT.	RECEPTACLE
REF.	REFERENCE
REG.	REGISTER
REINF.	REINFORCED, REINFORCING
REM.	REMOVE
REQ.	REQUIRED
RES.	RESILIENT
RET.	RETAIN
REV.	REVISION
RFG.	ROOFING
RFL.	REFLECT(OR)(ED)(IVE)
RM.	ROOM
RO.	ROUGH OPENING
Ø	ROUND, DIAMETER
SAN.	SANITARY
SC.	SOLID CORE
SCH.	SCHEDULE
SEAL.	SEALANT
SECT.	SECTION
SF.	SQUARE FOOT(FEET)
SH.	SHELF, SHELVING
SHO.	SHOWER
SHT.	SHEET
SHTG.	SHEATHING
SIM.	SIMILAR
SPEC.	SPECIFICATION(S)
SPKR.	SPEAKER
SQ.	SQUARE
SST.	STAINLESS STEEL
STA.	STATION
STC.	SOUND TRANSMISSION CLASS
STD.	STANDARD
STL.	STEEL
STG.	STORAGE
STRUCT.	STRUCTURE, STRUCTURAL
SUP.	SUPPORT
SUR.	SURFACE
SUSP.	SUSPENDED
SW.	SWITCH
SY.	SQUARE YARD
SYM.	SYMMETRICAL
SYN.	SYNTHETIC
SYS.	SYSTEM
T.	TOILET
T&G	TONGUE & GROOVE
TEL.	TELEPHONE
TEMD.	TEMPERED
TEMP.	TEMPORARY
M	TEXTURED
THK.	THICK(NESS)
THR.	THRESHOLD
THRU.	THROUGH
TOC.	TOP OF CONCRETE OR CURB
TOL.	TOLERANCE
TOP.	TOP OF PAVEMENT
TOS.	TOP OF SLAB OR STEEL
TOW.	TOP OF WALL
TR.	TREAD
TRANS.	TRANSPARENT
TRT.	TREATED
TV.	TELEVISION
TYP.	TYPICAL
UC.	UNDERCUT
UL.	UNDERWRITER'S LABORATORY
UNFIN.	UNFINISHED
UNO.	UNLESS NOTED OTHERWISE
UR.	URINAL
UTIL.	UTILITY
VAR.	VARNISH
VENT.	VENTILATION
VERT.	VERTICAL
VEST.	VESTIBULE
VNR.	VENEER
VOL.	VOLUME
VTR.	VENT THROUGH ROOM
VWC.	VINYL WALL COVERING
VYL.	VINYL
W.	WIDE, WIDTH
W/	WITH
W/OUT.	WITHOUT
WD.	WOOD
WIN.	WINDOW
WK.	WORKING
WRG.	WATER RESISTANT GYPSUM
WSCT.	WAINSCOT
WT.	WEIGHT
WWF.	WELDED WIRE FABRIC



TYPICAL MOUNTING HEIGHTS



MATERIALS LEGEND

(TYPICAL UNLESS NOTED OTHERWISE)

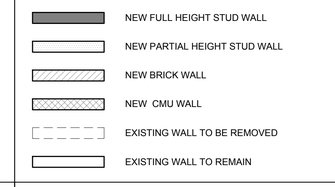
ALL DIMENSIONS SHOWN AS FOLLOWS:

FRAMED CONSTRUCTION
WALLS: FACE OF STUD TO FACE OF STUD
DOORS / WINDOWS: CENTERLINE OF CLEAR ROUGH OPENING
ALL ANGLES ARE 45° OR 90° UNLESS OTHERWISE NOTED

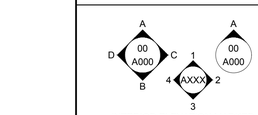
MASONRY / CONCRETE CONSTRUCTION
WALLS: FACE OF MASONRY TO FACE OF MASONRY
DOORS / WINDOWS: MASONRY OPENING

FINISHED DIMENSIONS SHALL BE NOTED AS EITHER FINISHED OR CLEAR ON DIMENSION STRING

DIMENSIONING NOTES

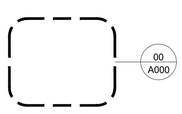


WALL LEGEND

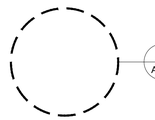


INTERIOR ELEVATION MARKER

TOP LINE = DRAWING NUMBER
BOTTOM LINE = SHEET NUMBER



PLAN DETAIL REFERENCE



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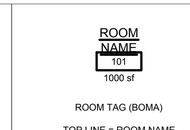
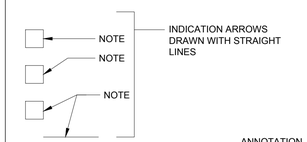
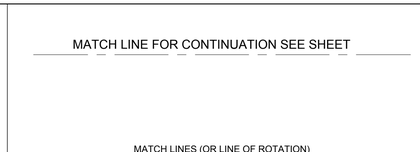


ROOM TAG (BOMA)

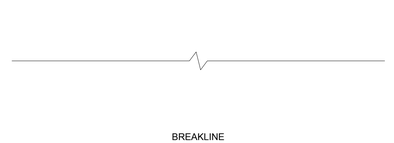
TOP LINE = ROOM NAME
INSIDE BOX = ROOM NUMBER
BOTTOM LINE = SQUARE FOOTAGE



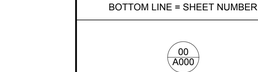
ANNOTATION



MATCH LINES (OR LINE OF ROTATION)

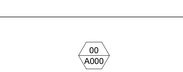


BREAKLINE



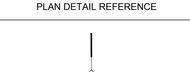
DETAIL TAG

TOP LINE = DRAWING NUMBER
BOTTOM LINE = SHEET NUMBER

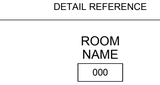


DETAIL HEX (ALTERNATE)

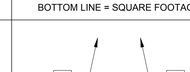
TOP LINE = DRAWING NUMBER
BOTTOM LINE = SHEET NUMBER



WALL OR PARTITION TAG

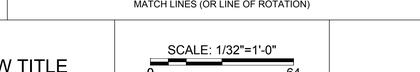


ROOM TAG
TOP LINE(S) = ROOM NAME
INSIDE BOX = ROOM NUMBER



CODED NOTE

FURNITURE TAG



DRAWING TITLE

GRAPHIC SCALE

LAYOUT GRID LINES

SECTION

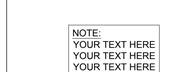
TOP LINE = DRAWING NUMBER
BOTTOM LINE = SHEET NUMBER

BASIC CEILING TAG (SMALL)

TOP LINE = CEILING HEIGHT
BOTTOM LINE = CEILING FINISH

LEVEL TAG

MILLWORK SECTION

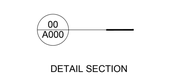


GENERAL NOTE

DATUM

EXTERIOR OR BUILDING ELEVATION

TOP LINE = DRAWING NUMBER
BOTTOM LINE = SHEET NUMBER

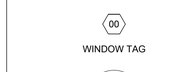


DETAIL SECTION

TOP LINE = DRAWING NUMBER
BOTTOM LINE = SHEET NUMBER

SPOT LEVEL

ELEVATION LEVEL



EGRESS TAGS

NORTH ARROW

SYMBOLS LEGEND

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PROJECT
SUNY PURCHASE COLLEGE
VISUAL ARTS PERCEPTION LAB RENOVATION
735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT
MATTHEW D WITTEN
37334
STATE OF NEW YORK
02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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DRAWING NAME
SYMBOLS & ABBREVIATIONS

DRAWING NO.
G001

DEMOLITION NOTES

1. THE TERM "PATCH AND REPAIR" SHALL BE DEFINED AS: THE PROCESS OF REPAIRING FLOOR, WALL, OR CEILING SURFACES THAT HAVE BEEN DAMAGED OR ARE ADJACENT TO DEMOLISHED CONSTRUCTION. THE REPAIR SHALL INCLUDE, BUT NOT BE LIMITED TO: FILLING VOIDS SOLID WITH CONCRETE, PREPARING SURFACES FOR NEW FINISH MATERIAL PER MANUFACTURER'S RECOMMENDATIONS, MATCH EXISTING FINISHES AND MATERIALS WHERE NO NEW FINISHES ARE CALLED FOR, CLOSING WALL, FLOOR OR ROOF PENETRATIONS AS DIRECTED BY ARCHITECT.
2. THE TERM "SALVAGE" SHALL BE DEFINED AS: THE PROCESS OF THE CONTRACTOR CAREFULLY REMOVING THE MENTIONED ITEM, SUCH THAT IT IS IN A USABLE CONDITION, AND STORING IT (IN LOCATION DETERMINED BY OWNER) UNTIL NEEDED FOR THE CONSTRUCTION PHASE. IF THE CLIENT DOES NOT NEED SAID ITEM CONTRACTOR SHALL DISPOSE OF PROPERLY AT NO ADDITIONAL COST.
3. DEMOLITION CONTRACTOR TO COORDINATE ALL PHASES OF DEMOLITION FOR PROJECT AND NOTIFY ARCHITECT AT OF ANY DISCREPANCIES OR CONFLICTING CONDITIONS WHICH WOULD INTERFERE WITH THE SATISFACTORY COMPLETION OF THE WORK, PRIOR TO THE START OF CONSTRUCTION.
4. COMPLY WITH APPLICABLE LOCAL, STATE AND FEDERAL CODES AND REGULATIONS PERTAINING TO SAFETY OF PERSONS, PROPERTY AND ENVIRONMENTAL PROTECTION.
5. ERECT AND MAINTAIN DUSTPROOF PARTITIONS AS REQUIRED TO PREVENT SPREAD OF DUST, FUMES, AND SMOKE, ETC. TO OTHER PARTS OF THE BUILDING. ON COMPLETION, REMOVE PARTITIONS AND REPAIR DAMAGED SURFACES TO MATCH ADJACENT SURFACES.
6. IF DEMOLITION IS PERFORMED IN EXCESS OF THAT REQUIRED, RESTORE EFFECTED AREAS AT NO COST TO THE OWNER.
7. REMOVE FROM SITE DAILY AND LEGALLY DISPOSE OF REFUSE, DEBRIS, RUBBISH, AND OTHER MATERIALS RESULTING FROM DEMOLITION OPERATIONS. LEAVE ALL AREAS BROOM CLEAN DAILY.
8. REMOVE DESIGNATED PARTITIONS, COMPONENTS, BUILDING EQUIPMENT, AND FIXTURES AS REQUIRED FOR NEW WORK.
9. REMOVE ABANDONED ELECTRICAL, TELEPHONE AND DATA CABLING AND DEVICES, U.O.N.
10. REF. ARCHITECTURAL AND MEP DRAWINGS. COORDINATE SCOPE OF DEMOLITION WITH ARCH AND MEP.
11. DO NOT ABANDON ANY UTILITIES OR MATERIALS WITHIN SPACE. REMOVE BACK TO THE SOURCE.
12. THE G.C. IS TO FIELD VERIFY ALL DIMENSIONS USING THE CONSTRUCTION DOCUMENTS. IF ANY DISCREPANCIES EXIST, G.C. TO MARK UP THE DRAWINGS REFLECT THE ACTUAL CONDITION. FORWARD THEM TO THE ARCHITECT WITHIN (3) DAYS FOR REVIEW AND CLARIFICATION AS REQUIRED.

HVAC

13. COORDINATE REMOVAL AND / OR RELOCATION OF MECHANICAL UNITS WITH MEP DRAWINGS. RELOCATION OF UNITS REQUIRED BY NEW CONSTRUCTION SHALL BE COORDINATED WITH DEMOLITION WORK.
14. REMOVE ABANDONED HVAC EQUIPMENT, INCLUDING DUCT WORK. DEMO EXISTING MECHANICAL DUCTS BACK TO MAIN TRUNK, VERIFY WITH MEP PRIOR TO THE START OF ANY MECHANICAL DEMO WORK.
15. REMOVE ALL ABANDONED SMOKE FIRE DAMPERS AS REQUIRED BY NEW CONSTRUCTION, INCLUDING ALL ELECTRICAL AND CONNECTIONS.
16. CONTRACTOR SHALL MAINTAIN THE INTEGRITY AND CONTINUITY OF THE EXISTING. BASE BUILDING SYSTEMS AND SHALL EXERCISE CARE BY NOT DEMOLISHING, OR DISRUPTING ANY BASE BUILDING SYSTEMS. ANY DAMAGED AND/OR DISCONNECTED SERVICE SHALL BE RESTORED AT CONTRACTOR'S COST.

ELECTRICAL

17. MAINTAIN CIRCUIT CONTINUITY TO AREAS NOT AFFECTED BY WORK. CONTRACTOR SHALL REWORK BRANCH FEEDER HOME-RUNS AS REQUIRED TO KEEP CONTINUITY TO EXISTING LIGHT FIXTURES, EXIT SIGNS AND DEVICES IN AREAS NOT BE DEMOLISHED.

PLUMBING

18. IN DEMOLITION AREAS, UNUSED PIPING SHALL NOT BE ABANDONED "IN PLACE". PIPING SHALL BE REMOVED BACK TO SOURCE OR POINT OF DISCHARGE, AND THE RESULTING OPENINGS PLUGGED U.N.O.
19. EXISTING PLUMBING FIXTURES AND EQUIPMENT TO BE REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DISPOSED OF BY THE CONTRACTOR AS DIRECTED BY THE OWNER.
20. DISCONNECT AND REMOVE EXISTING UNUSED PIPING AND FIXTURES WITHOUT INTERRUPTING EXISTING REQUIRED FUNCTIONING SYSTEMS.
21. UNUSED PIPING AND RELATED ITEMS CONCEALED IN WALLS, FLOORS AND CEILING WITHIN THE STRUCTURE SHALL BE REMOVED WHERE EXPOSED TO VIEW. REMOVAL OF EXISTING PIPING SHALL BE DONE IN A SATISFACTORY MANNER TO THE ENGINEER AND BUILDING ENGINEER.
22. WASTE AND SANITARY DRAINAGE PIPING NOT BEING USED SHALL BE REMOVED AND PLUGGED AT ACTIVE MAIN OR RISER. NO DEAD ENDS SHALL REMAIN LONGER THAN TWO (2) FEET.

FIRE ALARM

23. ALL EXISTING FIRE ALARM EQUIPMENT TO REMAIN. WALL MOUNTED EQUIPMENT (I.E. HORN/STROBE) SHALL BE REMOVED PRIOR TO DEMOLITION OF WALL FINISH MATERIALS AN SALVAGED FOR REINSTALLATION AFTER THE NEW WALL FINISH MATERIAL HAS BEEN INSTALLED.

ACCESSIBILITY NOTES

1. ADA COMPLIANCE - PREMISES MUST COMPLY WITH TITLE III OF THE AMERICANS WITH DISABILITIES ACT (ADA). COMPLIANCE WILL INCLUDE, BUT NOT LIMITED TO, THE DESIGN, CONSTRUCTION AND/OR ALTERATION OF THE PREMISES.
2. IN ALL BUILDINGS, FLOORS OF A GIVEN STORY SHALL BE A COMMON LEVEL THROUGHOUT, OR SHALL BE CONNECTED BY PEDESTRIAN RAMPS, PASSENGER ELEVATORS OR SPECIAL ACCESS LIFT
3. FLOOR SURFACES SHALL BE SLIP-RESISTANT.
4. EVERY CORRIDOR AND AISLE SERVING AN OCCUPANT LOAD OF 10 OR MORE SHALL BE NOT LESS THAN 44" IN WIDTH.
5. ABRUPT CHANGES IN LEVEL ALONG ANY ACCESSIBLE ROUTE SHALL NOT EXCEED 1/2" IN HEIGHT. LEVEL CHANGES NOT EXCEEDING 1/4" MAY BE VERTICAL. BEVEL OTHERS W/ A SLOPE NO GREATER THAN 1:2
6. LATCHING AND LOCKING DOORS THAT ARE HAND ACTIVATED AND WHICH ARE IN A PATH OF TRAVEL SHALL BE OPERABLE WITH A SINGLE EFFORT BY LEVER TYPE HARDWARE, PANIC BARS, PUSH-PULL ACTIVATING BARS, OR OTHER HARDWARE DESIGNED TO PROVIDE PASSAGE WITHOUT REQUIRING THE ABILITY TO GRASP THE OPENING HARDWARE. MOUNT DOOR OPENING HARDWARE BETWEEN 30" AND 44" ABOVE FLOOR FINISH.
7. MAXIMUM PULL OR PUSH EFFORT TO OPERATE DOORS SHALL NOT EXCEED 5 POUNDS FOR EXTERIOR DOORS AND 5 POUNDS FOR INTERIOR DOORS, MEASURED AT RIGHT ANGLES TO HINGED DOORS AND AT CENTER PLANE OF SLIDING OR FOLDING DOORS. CORRESPONDING DEVICES OR AUTOMATIC DOOR OPERATORS MAY BE UTILIZED TO MEET THE ABOVE STANDARDS. MAXIMUM EFFORT TO OPERATE REQUIRED FIRE DOORS MAY BE INCREASED NOT TO EXCEED 15 POUNDS.
8. THE BOTTOM 10" OF ALL DOORS (EXCEPT SLIDING AND AUTOMATIC) SHALL HAVE A SMOOTH UNINTERRUPTED SURFACE TO ALLOW THE DOOR TO BE OPENED BY A WHEELCHAIR FOOTREST WITHOUT CREATING A TRAP OR HAZARDOUS CONDITION. PROVIDE A 10" HIGH SMOOTH PANEL ON THE PUSH SIDE OF NARROW FRAME DOORS.
9. EVERY REQUIRED ENTRANCE OR PASSAGE DOORWAY SHALL BE NOT LESS THAN 3' IN WIDTH AND NOT LESS THAN 6'-8" IN HEIGHT. DOORS SHALL BE CAPABLE OF OPENING AT LEAST 90 DEGREES AND SHALL BE SO MOUNTED THAT THE CLEAR WIDTH OF THE DOORWAY IS NOT LESS THAN 32".
10. WHERE A PAIR OF DOORS IS UTILIZED, AT LEAST ONE OF THE DOORS SHALL PROVIDE A CLEAR, UNOBSTRUCTED OPENING WIDTH OF 32" WITH THE LEAF POSITIONED AT AN ANGLE OF 90 DEGREES FROM ITS CLOSED POSITION.
11. IDENTIFY ACCESSIBLE ENTRANCES WITH AT LEAST ONE STANDARD SIGN AND WITH ADDITIONAL DIRECTIONAL SIGNS, AS REQUIRED, VISIBLE FROM APPROACHING PEDESTRIAN WAYS.
12. THE FLOOR OR LANDING ON EACH SIDE OF AN ENTRANCE OR PASSAGE DOOR SHALL BE LEVEL AND CLEAR. THE LEVEL AND CLEAR AREA SHALL HAVE A LENGTH IN THE DIRECTION OF DOOR SWING OF AT LEAST 60" AND THE LENGTH OPPOSITE THE DIRECTION OF DOOR SWING OF 44" AS MEASURED AT RIGHT ANGLES TO THE PLANE OF THE DOOR IN ITS CLOSED POSITION.
13. FLOORS OR LANDINGS SHALL BE NOT MORE THAN 1/2" LOWER THAN THE THRESHOLD OF THE DOORWAY. CHANGE IN LEVEL BETWEEN 1/4" AND 1/2" SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2.
14. TO ALERT THE VISUALLY IMPAIRED, MARK THE UPPER APPROACH AND THE LOWER TREAD OF EACH INTERIOR STAIR WITH A STRIP OF CLEARLY CONTRASTING COLOR AT LEAST 2" WIDE, PLACED PARALLEL TO AND NOT MORE THAN 1" FROM THE NOSE OF THE STEP OR LANDING. THE STRIP SHALL BE OF A MATERIAL THAT IS AT LEAST AS SLIP RESISTANT AS THE OTHER TREADS OF THE STAIR.
15. CENTER ELECTRICAL RECEPTACLE OUTLETS NOT LESS THAN 15" ABOVE THE FLOOR OR WORKING PLATFORM.
16. PROVIDE A CLEAR FLOOR SPACE 30" X 48" IN FRONT OF LAVATORY TO PERMIT A FORWARD APPROACH.
17. FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 POUNDS. LEVER OPERATED, PUSH TYPE AND ELECTRONICALLY CONTROLLED MECHANISMS ARE EXAMPLES OF ACCEPTABLE DESIGNS. SELF CLOSING ARE ALLOWED IF THE FAUCET REMAINS OPEN FOR AT LEAST 10 SECONDS.
18. INSULATE OR OTHERWISE COVER HOT WATER AND DRAIN PIPES UNDER LAVATORIES.
19. THE LOW DRINKING FOUNTAIN BUBBLER SHALL BE ACTIVATED BY MANUALLY OPERATED SYSTEM NOT REQUIRING A FORCE GREATER THAN 5lbf THAT IS LOCATED WITHIN 6 INCHES OF THE FRONT EDGE OF THE FOUNTAIN OR AN ELECTRONICALLY CONTROLLED DEVICE.
20. THE BUBBLER OUTLET ORIFICE SHALL BE LOCATED WITHIN 6" OF THE FRONT OF THE LOW DRINKING FOUNTAIN AND SHALL BE WITHIN 36" OF THE FLOOR. THE WATER STREAM FROM THE BUBBLER SHALL BE SUBSTANTIALLY PARALLEL TO THE FRONT EDGE OF THE DRINKING FOUNTAIN.
21. WALKS, SIDEWALKS AND PEDESTRIAN WAYS SHALL BE FREE OF GRATING WHENEVER POSSIBLE. FOR GRATINGS LOCATED IN THE SURFACE OF ANY OF THESE AREAS GRID OPENINGS IN GRATINGS SHALL BE NO GREATER THAN 1/2" WIDE IN ONE DIRECTION. IF GRATINGS HAVE ELONGATED OPENINGS, THEY SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

CLOSEOUT NOTES

1. THE CONTRACTOR SHALL ARRANGE FOR ALL INSPECTIONS AND FURNISH OWNER'S REPRESENTATIVE WITH THE CERTIFICATE OF OCCUPANCY. G.C. IS ALSO TO PROVIDE A TYPE-WRITTEN LIST OF NAMES, ADDRESSES AND PHONE NUMBERS OF ALL SUBCONTRACTORS AND MATERIAL SUPPLIERS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING THE ENTIRE SPACE CLEANED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AT THE TIME OF TURNOVER.
3. PRIOR TO OPENING OF SPACE, CONTRACTOR IS TO ARRANGE FOR A NEBB CERTIFIED INDEPENDENT BALANCING CONTRACTOR TO BALANCE THE HVAC SYSTEM AND PROVIDE A COPY OF THE BALANCING REPORT TO THE OWNER AND LANDLORD'S REPRESENTATIVE IN A FORMAT ACCEPTABLE TO THE LANDLORD.
4. CONTRACTOR TO TURN OVER ALL KEYS TO THE OWNER'S REPRESENTATIVES AND MARK EACH KEY FOR IDENTIFICATION.
5. THE CONTRACTOR SHALL SET ALL THE TIME CLOCKS, THERMOSTATS, ETC. PER THE REQUIREMENTS OF THE OWNER'S REPRESENTATIVE.
6. THE CONTRACTOR SHALL EXPLAIN THE OPERATION OF ALL MECHANICAL SYSTEMS TO THE OWNER'S REPRESENTATIVE AND PROVIDE COPIES OF OPERATION, MAINTENANCE AND WARRANTY MANUALS.
7. GENERAL CONTRACTOR SHALL SUBMIT ONE COMPLETE SET OF REPRODUCIBLE DRAWINGS INDICATING ALL DISCREPANCIES, CHANGES, ETC. AND ACTUAL LOCATIONS OF CONCEALED WORK (I.E., UNDERGROUND CONDUIT) TO THE OWNER'S REPRESENTATIVE. THE GENERAL CONTRACTOR SHALL ALSO SUBMIT A PHOTOCOPY OF THE ACTUAL PANEL DIAGRAM.
8. THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL WARRANTY THE WORK FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY TENANT OF FINISHED WORK.
9. THE GENERAL CONTRACTOR SHALL INSTALL NEW FILTERS IN THE HVAC UNITS AFTER FINAL CLEANING.

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO FEDERAL, STATE AND MUNICIPAL CODES AND ORDINANCES. THESE SHALL SUPERSEDE DRAWINGS, NOTES AND DIMENSIONS IN ALL CASES. THE ARCHITECT SHALL BE NOTIFIED OF SUCH CHANGES BEFORE WORK IS STARTED. CONTRACTOR SHALL OBTAIN PERMITS BEFORE STARTING WORK, AND OBTAIN APPROVALS OF ALL REGULATORY AGENCIES UPON COMPLETION, AND AS REQUIRED
2. THE CONTRACT DOCUMENTS CONSIST OF THE DRAWINGS, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, OWNER-CONTRACTOR AGREEMENTS AND ALL ADDENDA ISSUED PRIOR TO AND ALL PLAN CHANGES ISSUED AFTER EXECUTION OF THE CONTRACT.
3. ALL WORK PERFORMED SHALL COMPLY WITH THE CONTRACT DOCUMENTS AND DRAWINGS, INCLUDING THESE GENERAL NOTES. THE CONTRACTOR SHALL COORDINATE THE INTENT OF THE GENERAL NOTES WITH ALL TRADES.
4. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PAYING FOR AND OBTAINING ALL PERMITS, INSPECTIONS, REQUIRED TESTS AND UTILITY CONNECTIONS, TERMINATIONS, AND CAPPING UNLESS OTHERWISE NOTED.
5. AS REQUIRED BY CODE, EACH CONTRACTOR AND EACH SUBCONTRACTOR SHALL OBTAIN REQUIRED INSPECTION OF THAT PORTION OF WORK.
6. CONTRACTOR TO REVIEW DOCUMENTS, VERIFY DIMENSIONS AND FIELD CONDITIONS AND CONFIRM THAT WORK IS BUILDABLE AS SHOWN. REPORT ANY CONFLICTS OR OMISSIONS TO THE ARCHITECT FOR CLARIFICATION PRIOR TO PERFORMING ANY WORK IN QUESTION.
7. GENERAL CONTRACTOR SHALL SUBMIT A DETAILED PROJECT SCHEDULE AND IS SOLELY RESPONSIBLE FOR CONSTRUCTION SEQUENCING, METHODS AND TECHNIQUES.
8. CONTRACTOR TO COORDINATE WORK WITH THE OWNER, INCLUDING SCHEDULING TIME AND LOCATIONS FOR DELIVERIES, BUILDING ACCESS, USE OF BUILDING SERVICES AND FACILITIES, AND USE OF ELEVATORS. COORDINATE WORK WITH OTHER CONTRACTS. MINIMIZE DISTURBANCE OF BUILDING FUNCTIONS AND OCCUPANTS, INCLUDING TRASH REMOVAL ACCESS.
9. UNLESS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS AS BEING NOT IN CONTRACT (N.I.C.) OR EXISTING; ALL ITEMS, MATERIALS AND INSTALLATION OF SAME ARE A PART OF THE CONTRACT DEFINED BY THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL ACCESSORIES, COMPONENTS AND ASSEMBLIES REQUIRED FOR THE WORK SHOWN.
10. OWNER WILL PROVIDE WORK NOTED "BY OTHERS" OR "NIC" UNDER SEPARATE CONTRACT. CONTRACTOR TO INCLUDE SCHEDULE REQUIREMENTS IN CONSTRUCTION PROGRESS SCHEDULE AND COORDINATE TO ASSURE ORDERLY SEQUENCE OF INSTALLATION.
11. ANY WORK INVOLVING ALTERATIONS TO EXISTING BUILDING UTILITIES & WHICH REQUIRE UTILITY SHUT DOWN, SHALL BE COORDINATED WITH THE OWNER AND SHALL REQUIRE A MIN. OF (5) FIVE DAYS NOTICE.
12. CONTRACTOR TO MAINTAIN EXITS, EXIT LIGHTING, FIRE PROTECTIVE DEVICES, AND ALARMS IN CONFORMANCE WITH CODES AND ORDINANCES.
13. CONTRACTOR TO PROTECT AREA OF WORK AND ADJACENT AREAS FROM DAMAGE.
14. CONTRACTOR TO MAINTAIN WORK AREAS SECURE AND LOCKABLE DURING CONSTRUCTION.
15. IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO KEEP THE PREMISES CLEAN OF DEBRIS, RUBBISH, EXCESS MATERIALS, ETC. RESULTING FROM THE WORK OF THIS CONTRACT. ALL AREAS SHALL BE BROOM CLEAN EACH WORK DAY. AT THE END OF THE JOB THE SPACE SHALL BE BROOM CLEANED ONE LAST TIME WITH ALL LABELS, STICKERS, PAINT AND WRAPPING MATERIALS REMOVED FROM FIXTURES, WINDOWS AND FLOORS AS TO REQUIRE ONLY NORMAL WASHING AND CLEANING PRIOR TO THE TURNOVER OF THE SPACE TO THE TENANT.
16. DO NOT SCALE DRAWINGS. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON DRAWINGS. SCALES ON DRAWINGS ARE FOR GENERAL REFERENCE ONLY. GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS, GRADES AND CONDITIONS AT SITE PRIOR TO COMMENCING THE WORK, AND REPORT ANY DISCREPANCIES TO THE CONSTRUCTION MANAGER IN WRITING.
17. WHERE EXISTING ACCESS PANELS CONFLICT WITH CONSTRUCTION. CONTRACTOR TO RELOCATE PANELS TO ALIGN WITH AND FIT WITHIN NEW CONSTRUCTION.
18. CONTRACTOR SHALL PROVIDE CONSTRUCTION BARRICADES OR FENCING AS REQUIRED AND AS APPROVED BY THE CITY FOR PUBLIC SAFETY PRIOR TO COMMENCING THE WORK.
19. FIRE PROTECTION EQUIPMENT AND SERVICE ACCESS MUST BE PROVIDED DURING THE CONSTRUCTION PERIOD AS REQUIRED BY THE COUNTY.
20. CONTRACTOR SHALL PROVIDE TEMPORARY EXIT SIGNS TO ASSURE A MEANS OF EGRESS DURING CONSTRUCTION.
21. WHERE A TYPICAL CONDITION IS DETAILED, IT SHALL BE UNDERSTOOD THAT ALL LIKE OR SIMILAR CONDITIONS ARE THE SAME UNLESS SPECIFICALLY NOTED OR DETAILED OTHERWISE.
22. PUBLIC IMPROVEMENTS AND SERVICES ADJACENT TO THE SITE SHALL BE MAINTAINED DURING CONSTRUCTION. APPROVAL OF THE CITY ENGINEERING DEPARTMENT IS REQUIRED BEFORE ANY WORK IS COMMENCED.
23. EXCEPT WHERE SHOWN IN DIMENSIONAL DETAIL, THE LOCATIONS OF PLUMBING, MECHANICAL EQUIPMENT, DUCTS, PIPING, AND FITTING ARE ONLY APPROXIMATE. THE EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR, SUBJECT TO APPROVAL BY THE ARCHITECT.
24. CONTRACTOR SHALL VERIFY SIZES AND LOCATIONS OF ALL MECHANICAL EQUIPMENT PADS AND BASES AS WELL AS POWER AND WATER OR DRAIN INSTALLATIONS WITH EQUIPMENT MANUFACTURERS BEFORE PROCEEDING WITH THE WORK. CHANGES TO ACCOMMODATE FIELD CONDITIONS OR SUBSTITUTIONS SHALL BE MADE AT NO ADDITIONAL COST.
25. CONTRACTOR SHALL PROVIDE AND INSTALL ALL STIFFENERS, BRACING, BLOCKING, BACK-UP PLATES AND SUPPORTING BRACKETS REQUIRED FOR THE INSTALLATION OF ALL CASEWORK, TOILET ROOM ACCESSORIES, FIXTURES AND PARTITIONS AND ALL WALL MOUNTED OR SUSPENDED MECHANICAL, ELECTRICAL OR MISCELLANEOUS EQUIPMENT AND FURNISHINGS.
26. THE ORGANIZATION OF THE DRAWINGS AND SPECIFICATIONS SHALL NOT CONTROL THE CONTRACTOR IN DIVIDING THE WORK AMONG SUBCONTRACTORS OR IN ESTABLISHING THE EXTENT OF WORK TO BE PERFORMED BY ANY TRADE.
27. IN THE EVENT OF DISCREPANCIES IN THE DRAWINGS, THE COSTLIER OR MORE RESTRICTIVE CONDITIONS SHALL BE DEEMED THE CONTRACT REQUIREMENT, UNLESS OTHERWISE STATED IN WRITING, FROM THE OWNER OR OWNER'S REPRESENTATIVE. ANY DISCREPANCIES SHOULD IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
28. GENERAL CONTRACTOR SHALL WARRANT WORK PERFORMED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
29. CHARGES FOR EXTRA WORK DONE BY THE CONTRACTOR WILL NOT BE HONORED UNLESS THE WORK AND THE AMOUNT ARE AGREED TO BY THE OWNER, OR THEIR AGENT, IN WRITING BEFORE THE WORK IS DONE, BASED UPON UNIT PRICING.
30. EXCEPT WHERE MORE STRINGENT REQUIREMENTS ARE INDICATED ON THESE DRAWINGS AND IN THESE NOTES, COMPLY WITH GENERALLY ACCEPTED INDUSTRY STANDARDS AND INSTALL PRODUCTS IN STRICT COMPLIANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS
31. THE G.C. IS TO VERIFY THE EXISTING CONDITIONS OF THE SPACE INCLUDING BUT NOT LIMITED TO SLAB CONDITION AND ANY ISSUES THAT MAY EFFECT NEW FLOOR FINISH, IF ANY ISSUES EXIST, CONTACT ARCHITECT.
32. THE STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS (IF ANY) ARE SUPPLEMENTARY TO THE ARCHITECTURAL DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK WITH THE ARCHITECTURAL DRAWINGS BEFORE THE INSTALLATION OF STRUCTURAL, MECHANICAL AND ELECTRICAL WORK. SHOULD THERE BE A DISCREPANCY BETWEEN THE ARCHITECTURAL DRAWINGS AND THE CONSULTING ENGINEERS' DRAWINGS THAT WOULD CAUSE AN AWKWARD INSTALLATION, IT SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR CLARIFICATION PRIOR TO INSTALLATION OF SAID WORK. ANY WORK INSTALLED IN CONFLICT WITH THE ARCHITECTURAL DRAWINGS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
33. NO DEVIATION FROM CONTRACT DRAWINGS AND SPECIFICATIONS SHALL BE MADE WITHOUT WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER.
34. WHEN EVALUATING APPEARANCE OR CONFORMANCE WITH DESIGN INTENT, THE WORDS "ACCEPTABLE", "VISIBLE", "INVISIBLE", "MATCHING", "ALIGNED", AND SIMILAR TERMS OF JUDGMENT SHALL MEAN "ACCEPTABLE, ETC., IN THE OPINION OF THE ARCHITECT OR OWNER".
35. CONTRACTOR TO CONDUCT SITE MEETINGS AND WRITE MEETING MINUTES AT FREQUENCY AS DIRECTED BY OWNER. CONTRACTOR AND NECESSARY SUB-CONTRACTORS MUST BE PRESENT, UNLESS WAIVED BY OWNER.
36. CONSTRUCTION WORK HOURS SHALL BE COORDINATED WITH OWNERS SITE REPRESENTATIVE.
37. ALL MATERIALS USED IN THE CONSTRUCTION OF THIS PROJECT MUST BE ASBESTOS FREE.
38. ANY PENETRATION OR MODIFICATIONS TO STRUCTURAL STEEL OR CONCRETE MUST BE COORDINATED AND APPROVED BY LANDLORD'S ON-SITE REPRESENTATIVE.
39. ALL REUSED MATERIAL AND EQUIPMENT MUST BE REFURBISHED TO "LIKE NEW" CONDITION.
40. ANY ATTACHMENTS TO STRUCTURE SHALL BE FROM TOP CHORD OF JOIST. NO ATTACHMENT TO THE ROOF DECK IS PERMITTED.
41. CONTRACTOR SHALL PERFORM FIRST-CLASS WORKMANSHIP. ACCEPTANCE IS CONTINGENT UPON OWNERS APPROVAL.
42. DIMENSIONS SHOWN ON PLAN ARE TAKEN FROM FACE OF STUD TO FACE OF STUD.
43. WHERE DIMENSIONS EXIST WITH EXISTING CONSTRUCTION, DIMENSIONS ARE TAKEN FROM FACE OF EXISTING CONSTRUCTION TO FACE OF EXISTING CONSTRUCTION.

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

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PROJECT NUMBER: 1418283

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DRAWING NAME

GENERAL NOTES

DRAWING NO.

G002

MECHANICAL NOTES

1. MECHANICAL SUPPLY AND RETURN AIR SHAFTS SHALL BE AIRTIGHT AND SEALED.
2. COVER RETURN AIR OPENINGS BEFORE AND DURING CONSTRUCTION.

ELECTRICAL NOTES

1. ELECTRICAL SUBCONTRACTOR TO VERIFY SERVICE PROVIDED IS ADEQUATE. IF NOT, NOTIFY ARCHITECT IMMEDIATELY.
2. PRIOR TO TRENCHING/CORING SLAB, REVIEW LOCATIONS WITH ARCHITECT AND COORDINATE LOCATIONS WITH OWNER. ALL LOCATIONS SHALL BE MARKED FOR LANDLORD APPROVAL PRIOR TO TRENCHING/CORING.
3. COORDINATE INSTALLATION OF TELECOMMUNICATIONS, DATA AND SECURITY SYSTEMS.
4. VERIFY EQUIPMENT SPECIFICATIONS, POWER AND INSTALLATION REQUIREMENTS WITH MANUFACTURER TO ENSURE PROPER FIT AND FUNCTION.
5. VERIFY MOUNTING REQUIREMENTS OF ELECTRICAL, TELEPHONE AND OTHER EQUIPMENT. PROVIDE NON-COMBUSTIBLE BLOCKING WITHIN WALLS AS REQUIRED FOR PROPER EQUIPMENT INSTALLATION.
6. GANG ADJACENT LIGHT SWITCHES AND COVER WITH A SINGLE PLATE.
7. INDICATED DIMENSIONS ARE TO THE CENTER LINE OF OUTLET OR SWITCH, OR CLUSTER OF OUTLETS OR SWITCHES, UNLESS OTHERWISE NOTED.
8. INSTALL OUTLETS ON OPPOSITE SIDES OF PARTITIONS IN SEPARATE STUD CAVITIES. DO NOT INSTALL BACK-TO-BACK.
9. PROVIDE MATCHING COVER PLATES, RECEPTACLES AND RELATED ITEMS. PROVIDE ONE-PIECE TYPE GANG COVER PLATES, UNLESS OTHERWISE NOTED.
10. IDENTIFY DEDICATED OR ISOLATED GROUND ELECTRICAL OUTLETS WITH A RED DOT.
11. MOUNT STANDARD WALL OUTLETS, SWITCHES AND THERMOSTATS AT HEIGHTS REQUIRED BY ADA GUIDELINES, UNLESS OTHERWISE NOTED. WHEN THERMOSTATS AND LIGHT SWITCH OCCUR TOGETHER, INSTALL BOTH ALIGNED HORIZONTALLY WITH CENTER LINE AT +3'-2" ABOVE FINISHED FLOOR.
12. ALL OUTLETS TO BE INSTALLED AS DIMENSIONED ON THIS PLAN. ANY DISCREPANCIES BETWEEN PLAN AND EXISTING FIELD CONDITIONS SHALL BE CLARIFIED WITH THE ARCHITECT BEFORE COMMENCEMENT OF WORK.
13. ALL ELECTRICAL AND TELEPHONE WORK TO BE INSTALLED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF ALL ELECTRICAL CODES, NATIONAL BOARD OF FIRE UNDERWRITERS, UTILITY COMPANIES, TELEPHONE COMPANIES, THE LANDLORD, AND ALL OTHER AUTHORITIES HAVING JURISDICTION.
14. THE GC SHALL PROVIDE ALL CUTTING AND PATCHING OF FLOORS, WALLS AND CEILING AS REQUIRED.
15. ALL SURFACES WITH EXISTING OUTLETS BEING REMOVED SHALL BE PATCHED FLUSH WITH ADJACENT WALL SURFACES.
16. ALL TELEPHONE OUTLETS SHALL BE PROVIDED WITH TWO (2) PULL STRINGS BACK TO THE TELEPHONE EQUIPMENT.
17. U.O.N, ALL ELECTRICAL, TELEPHONE, AND DATA OUTLETS ARE TO BE MOUNTED 15" A.F.F.
18. CENTERLINE TO CENTERLINE DIMENSIONS OF ANY OUTLET PAIR OR GROUP SHALL NOT EXCEED 6".
19. CONTRACTOR TO COORDINATE TELECOMMUNICATIONS, DATA AND SECURITY SYSTEM INSTALLATIONS.
20. IF THE SPACE ABOVE THE SUSPENDED CEILING IS USED AS A RETURN AIR PLENUM, ALL EQUIPMENT AND WIRING(COMMUNICATION, POWER ETC) SHALL BE LISTED FOR INSTALLATION IN A PLENUM.

FIRE DEPARTMENT NOTES

1. PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A WITHIN 75 FOOT TRAVEL DISTANCE TO ALL PORTIONS OF THE PROJECT, AND ADDITIONAL EXTINGUISHERS AS REQUIRED BY FIRE DEPARTMENT FIELD INSPECTOR OR BUILDING DEPARTMENT INSPECTOR
2. PROVIDE EXIT SIGN WITH 6" LETTERS OVER REQUIRED EXITS, WHERE SHOWN ON DRAWINGS, AND ADDITIONAL SIGNS AS REQUIRED BY BUILDING DEPARTMENT INSPECTOR OR FIRE DEPARTMENT FIELD INSPECTOR. CONNECT EXIT SIGNS TO EMERGENCY POWER CIRCUITS. COMPLY WITH BUILDING CODES
3. PROVIDE EMERGENCY LIGHTING OF ONE FOOT-CANDLE AT FLOOR LEVEL. COMPLY WITH BUILDING CODES.
4. MAINTAIN AISLES AT LEAST 44" WIDE AT PUBLIC AREAS.
5. EVERY EXIT DOOR SHALL BE OPERABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT. SPECIAL LOCKING DEVICES SHALL BE OF AN APPROVED TYPE. ALL NEW DOORS SHALL HAVE APPROVED LEVER HANDLES.
6. DOORS OPENING INTO REQUIRED 1-HOUR, FIRE-RESISTIVE CORRIDORS SHALL BE PROTECTED WITH A SMOKE OR DRAFT STOP ASSEMBLY HAVING A 20-MINUTE RATING AND SHALL BE SELF-CLOSING.
7. 20-MINUTE DOOR JAMBS TO BE TIGHT-FITTING, SMOKE AND DRAFT CONTROLLED.
8. EXIT DOORS SHALL SWING IN THE DIRECTION OF TRAVEL WHEN SERVING 50 OR MORE PERSONS AND IN ANY HAZARDOUS AREA.
9. PROVIDE FIRE DAMPERS OR DOORS WHERE AIR DUCTS PENETRATE FIRE-RATED WALLS OR CEILINGS.
10. STORAGE, DISPENSING OR USE OF ANY FLAMMABLE OR COMBUSTIBLE LIQUIDS, FLAMMABLE GAS AND HAZARDOUS SUBSTANCES SHALL COMPLY WITH CODE REGULATIONS.
11. WOOD BLOCKING SHALL BE FIRE TREATED IN ACCORDANCE WITH APPLICABLE CODE REQUIREMENTS, ALL FRT WOOD SHALL BEAR APPROPRIATE STAMP.
12. EXTEND OR MODIFY EXISTING FIRE/LIFE SAFETY SYSTEM AS REQUIRED TO PROVIDE AN APPROVED FIRE / LIFE SAFETY SYSTEM FOLLOWING APPROVAL BY LANDLORD'S LIFE SAFETY ENGINEER. SUBMIT PLANS TO FIRE DEPARTMENT WITH COMPLETE DESCRIPTION OF SEQUENCE OF OPERATION, AND OBTAIN APPROVAL PRIOR TO INSTALLATION.
13. LOCATE THE CENTER OF FIRE ALARM INITIATING DEVICES 48" ABOVE THE LEVEL OF THE FLOOR, WORKING PLATFORM, GROUND SURFACE OR SIDEWALK.
14. EMERGENCY WARNING SYSTEMS SHALL ACTIVATE A MEANS OF WARNING FOR THE HEARING IMPAIRED. FLASHING VISUAL WARNING SHALL HAVE A FREQUENCY OF NOT MORE THAN 60 FLASHES PER MINUTE.
15. ALL FIRE-RATED ASSEMBLES SHALL BE INSTALLED, LABELED, AND INSPECTED IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE WHEN REQUIRED.
16. PROVIDE FIRE WATCH AT ALL TIMES IF REQ'D BY BLDG RULES AND REGULATIONS AND APPLICABLE CODES.
17. THE CONTRACTOR MUST PROVIDE TO THE FIRE MARSHAL SPRINKLER DRAWINGS AND CALCULATIONS SPECIFICATIONS BEFORE A PERMIT WILL BE ISSUED BY THE BUILDING DEPARTMENT.

FINISH NOTES

1. ENSURE SURFACES TO RECEIVE FINISHES ARE CLEAN, TRUE, AND FREE OF IRREGULARITIES. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
2. REPAIR EXISTING SURFACES TO REMAIN AS REQUIRED FOR APPLICATION OF NEW FINISHES.
3. ANY REQUEST FOR MATERIAL SUBSTITUTE ARE TO BE SENT TO ARCHITECT AND/OR CLIENT FOR APPROVAL PRIOR TO PURCHASE AND INSTALLATION.
4. WIPE CLEAN ALL SURFACES WITH DAMP CLOTH.
5. RETOUCH OR REFINISH SURFACES DAMAGED BY SUBSEQUENT WORK AS DIRECTED BY GC. THE COST OF SUCH RESTORATION WORK SHALL BE BORNE BY SUB CONTRACTOR.
6. THE GC SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL THE FINISHES IN THE STORE, WALLS, FLOOR AND CEILING PRIOR TO TURNOVER. G.C. SHALL TOUCH UP ALL CORNER BEADS, WALLS, CEILING AND FLOORING AS REQUIRED PRIOR TO TURNOVER AND ANY DAMAGE CAUSED BY OTHER TRADES INCLUDING MILLWORKER.
7. EXAMINE ALL SURFACES TO BE PAINTED UNDER THIS CONTRACT TO VERIFY THAT WORK OF OTHER TRADES IS IN SATISFACTORY CONDITION TO RECEIVE SPECIFIED FINISH.
8. GC SHALL USE CLEAR CAULK BETWEEN MILLWORK AND GYPSUM BOARD WALLS IF REQUIRED TO CREATE A SMOOTH FINISH.
9. GYPSUM WALL BOARD SURFACES SHALL BE WIPED WITH A DAMP CLOTH JUST PRIOR TO APPLICATION OF THE FIRST COAT OF PAINT IN ORDER TO LAY FLAT ANY NAP WHICH MAY HAVE FORMED IN SANDING.
10. PAINTING SUBCONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OR REMOVAL & REINSTALLATION OF HARDWARE, SWITCH/OUTLET COVERS, ETC. TO PROTECT FROM PAINTING.
11. ALL PAINTED SURFACES TO RECEIVE (1) COAT PRIMER & (2) COATS FINISH PAINT (MINIMUM) WITH ADDITIONAL COATS AS REQUIRED FOR PROPER COVERAGE.
12. AT COMPLETION OF PAINTING, ALL PAINT MATERIALS & EQUIPMENT SHALL BE REMOVED, ALL PAINT SPOTS REMOVED AND ALL AREAS THOROUGHLY CLEANED. ANY DIRT OR DEBRIS CAUSED BY WORK SHALL BE CLEANED UP AS WORK PROGRESSES.
13. ALL FLOORING SUBCONTRACTORS SHALL HAVE A MINIMUM OF FIVE YEARS EXPERIENCE WORKING WITH RESPECTIVE FLOORING MATERIAL.
14. ALL FINISHED FLOORING TO BE PROTECTED BY G.C. FOLLOWING INSTALLATION.
15. ALL INTERIOR FINISHES AND FURNISHINGS ARE TO BE CLASS 'A' FIRE-RATED AND ARE TO COMPLY WITH CODE-REQUIRED (INTERIOR FLAME SPREAD) RATINGS.
16. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO SEAL AND CAULK AROUND ALL PENETRATIONS, CRACKS AND CREVICES AND ANY OPENINGS CAPABLE OF HARBORING INSECTS/RODENTS.
17. G.C. TO PROVIDE LEVEL 4 DRYWALL FINISH THROUGHOUT SPACE U.O.N.

REFLECTED CEILING NOTES

1. DESIGN SUSPENDED CEILING FRAMING SYSTEMS TO RESIST A LATERAL FORCE OF 20 % OF THE WEIGHT OF THE CEILING ASSEMBLY AND ANY LOADS TRIBUTARY TO THE SYSTEM. USE A MINIMUM CEILING WEIGHT OF 5 POUNDS PER SQUARE FOOT TO DETERMINE THE LATERAL FORCE WHERE CEILING LOADS DO NOT EXCEED POUNDS PER SQUARE FOOT AND WHERE PARTITIONS ARE NOT CONNECTED TO THE CEILING SYSTEM:
2. PROVIDE VERTICAL SUPPORT AS REQUIRED PER BUILDING CODES. IN ADDITION, VERTICALLY SUPPORT ENDS OF RUNNERS WITHIN 8" OF DISCONTINUITIES SUCH AS MAY OCCUR WHERE THE CEILING IS INTERRUPTED BY A WALL.
3. SUPPORT LIGHT FIXTURES AND AIR DIFFUSERS DIRECTLY BY WIRES TO THE STRUCTURE ABOVE.
4. LOCATE REGISTERS AND LIGHTING FIXTURES WITHIN GRID LINES. CENTER SPRINKLER HEADS, SPEAKERS, RECESSED FIXTURES, AND SIMILAR CEILING ELEMENTS IN ACOUSTICAL UNITS,U.O.N.
5. FINISH HVAC DIFFUSERS, DRAPERY POCKETS, AND SPEAKER GRILLES TO MATCH ADJACENT FINISH, UNLESS OTHERWISE NOTED.
6. ALL EQUIPMENT SHALL BEAR UL LABELS.
7. CONTRACTOR TO USE LASER FOR LEVELING OF ALL SOFFITS, CEILINGS AND SUSPENDED GRIDS.
8. EMERGENCY & EXIT LIGHTS TO BE INSTALLED ON SEPARATE CIRCUIT.
9. ALL FIXTURES TO BE INSTALLED IN ACOUSTIC CEILINGS TO BE CENTERED IN CEILING GRID,U.O.N.
10. HANGER WIRE AT SUSPENDED GYP BD CEILINGS TO BE 8 GA.; HANGER WIRE AT SUSPENDED ACOUSTICAL CEILINGS TO BE 10 GA
11. HANGER WIRES SHALL BE ATTACHED TO STRUCTURAL STEEL ONLY, WITH U.L. LISTED CLAMPS. DO NOT HANG SUPPORT WIRES FROM MECHANICAL EQUIPMENT OR PIPING. SCREWS ARE NOT PERMITTED IN METAL DECKING.
12. ALL SUSPENDED CEILING SYSTEMS TO BE INSTALLED PER INDUSTRY STANDARDS, ALL CODE REQUIREMENTS, AND ALL RECOMMENDATIONS OF THE MANUFACTURER OF THE SYSTEM.
13. ALL LIGHT FIXTURES, HVAC EQUIPMENT AND DIFFUSERS SHALL BE SUPPORTED FROM THE TOP CHORD OF STRUCTURAL JOIST ABOVE.
14. GC SHALL VERIFY ALL CEILING HEIGHTS, AND CONFIRM THAT THE WORK CAN BE BUILT AS SHOWN. IN THE EVENT OF ANY CONFLICTS OR OMISSIONS WITHIN THE DRAWINGS, GC TO CONTACT ARCHITECT FOR CLARIFICATION PRIOR TO THE PERFORMANCE OF ANY WORK IN QUESTION.
15. CEILING HEIGHT DIMENSIONS ARE TO FINISHED SURFACES.

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PROJECT

SUNY PURCHASE COLLEGE

VISUAL ARTS PERCEPTION LAB RENOVATION

735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

02/14/2019

ISSUED FOR: BID

ISSUED DATE: 02.11.2019

DRAWN BY: JW

CHECKED BY: CM

PROJECT NUMBER: 1418283

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DRAWING NAME

GENERAL NOTES

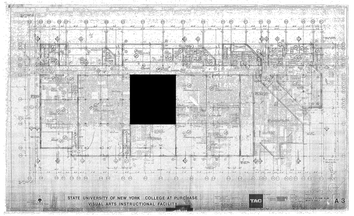
DRAWING NO.

G003

EGRESS / OCCUPANCY FUNCTION KEY

1. EDUCATIONAL AREA (20 NET)
2. EXHIBIT GALLERY AND MUSEUM (30 NET)
3. STORAGE (300 GROSS)

KEY PLAN



CODE INFORMATION KEY

- CONTINUOUS SMOKE BARRIER
- CONTINUOUS 1 HOUR FIRE RATING
- CONTINUOUS 2 HOUR FIRE RATING
- MAXIMUM TRAVEL DISTANCE
- DIRECTION OF EGRESS PATH
- CALCULATED OCCUPANT LOAD: ROOM S.F. / S.F. ALLOWANCE PER OCCUPANT = TOTAL ALLOWED OCCUPANTS
- *SEE "EGRESS/OCCUPANCY FUNCTION KEY" OCCUPANCY DESIGNATIONS & CALCULATED AREAS
- 123 — OCCUPANCY LOAD
- 76 / 165 — ACTUAL DOOR/STAIR CAPACITY / ALLOWED DOOR/STAIR CAPACITY
- O.L.= T.L. — ACTUAL OCCUPANTS WITH IN SPACE IF ANTICIPATED LARGER THAN CALCULATED
- NSO — NON SIMULTANEOUS OCCUPANCY
- HC ACCESSIBLE ROUTE

FIRE RESISTANCE RATINGS

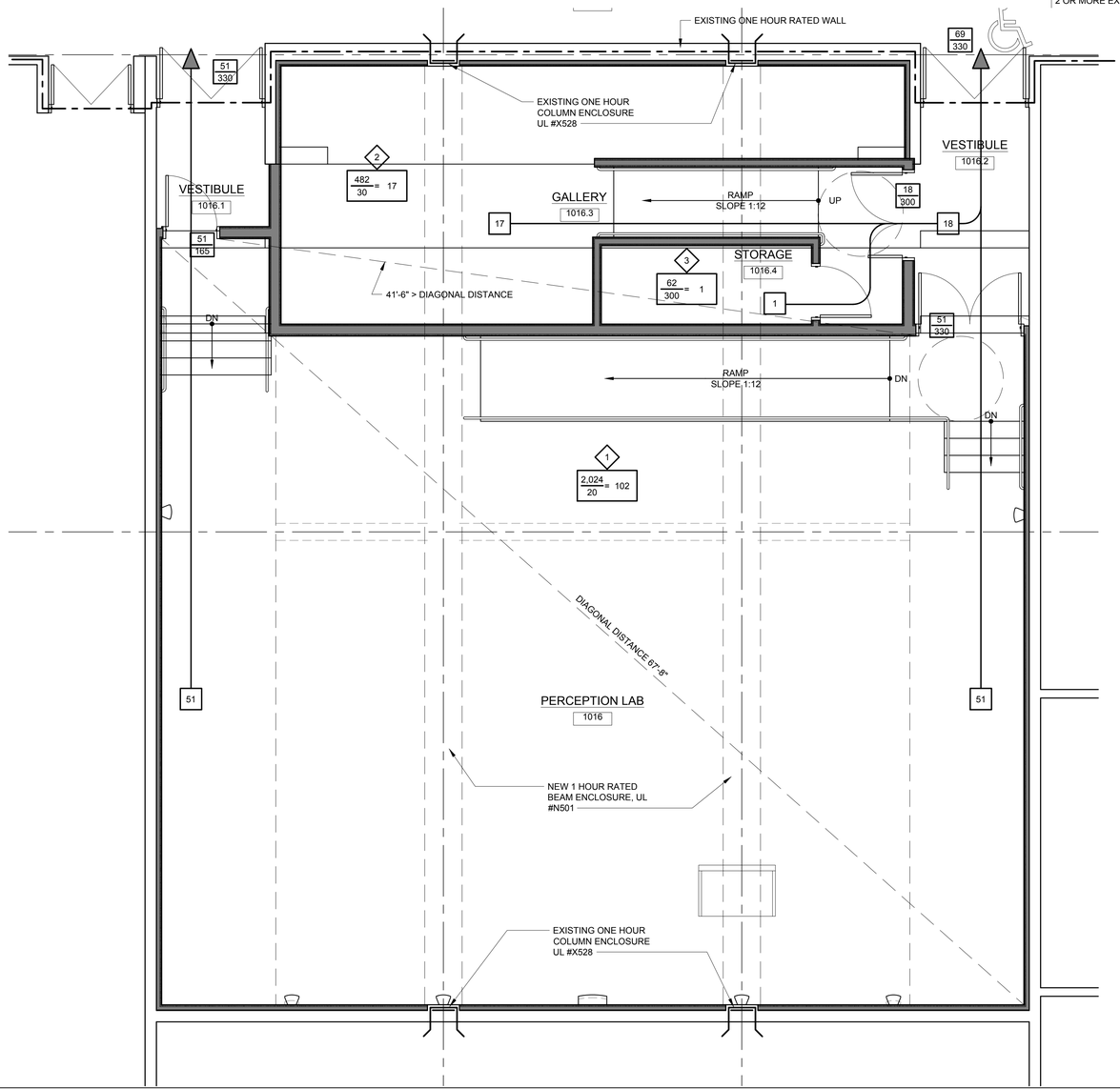
ITEM	CODE SECTION(S)	COMPLIANCE
PRIMARY STRUCTURE FRAME	IBC TABLE 601	1 HOUR(S)
BEARING WALLS		EXTERIOR: 1 HOUR(S) INTERIOR: 1 HOUR(S)
NON-BEARING WALLS		EXTERIOR: 0 HOUR(S) INTERIOR: 0 HOUR(S)
FLOOR CONSTRUCTION		1 HOUR(S)
ROOF CONSTRUCTION		1 HOUR(S)
CORRIDOR	IBC 709.3, TABLE 1018.1	1 HOUR(S) (WITHOUT SPRINKLER)
STAIR ENCLOSURE	IBC 1022.1	1 HOUR(S)

APPLICABLE CODES

BUILDING CODE	2015 INTERNATIONAL BUILDING CODE 2016 UNIFORM CODE SUPPLEMENT
PLUMBING CODE	2015 INTERNATIONAL PLUMBING CODE
MECHANICAL CODE	2015 INTERNATIONAL MECHANICAL CODE
ELECTRICAL CODE	2014 NATIONAL ELECTRICAL CODE
FIRE PREVENTION	2015 INTERNATIONAL FIRE CODE
ACCESSIBILITY	ICC/ANSI A117.12003
ENERGY CODE COMPLIANCE	NY STATE ENERGY CONSERVATION CONSTRUCTION CODE WITH 2016 SUPPLEMENT
ACCESSIBILITY CODE	2010 ADA STANDARDS

DESIGN DATA

ITEM	CODE SECTION(S)	COMPLIANCE
CONSTRUCTION TYPE	IBC 602.1	IIA
USE & OCCUPANCY CLASS	IBC 302 IBC 303.1.1	SEPARATED MIXED USE (B) A BUILDING OR TENANT SPACE USED FOR ASSEMBLY PURPOSES (A-3 GALLERY) WITH AN OCCUPANT LOAD OF LESS THAN 50 PERSONS SHALL BE CLASSIFIED AS A GROUP B OCCUPANCY
ACCESSORY OCCUPANCY	508.2.1	(S-2) STORAGE
ALLOWABLE AREA (B)	IBC TABLE 505.2	(B) = 37,500 SF, NON SPRINKLERED
ACTUAL AREA	-	EXISTING TO REMAIN
OCCUPANT LOAD	TABLE 1004.1.2	SEE CODE PLANS FOR OCCUPANT LOAD
ALLOWABLE BUILDING HEIGHT ()	IBC TABLE 504.3 & 504.4	(B) 65', 5 STORY(S) NON SPRINKLERED
ACTUAL BUILDING HEIGHT (IIIB)	-	EXISTING TO REMAIN
FIRE SUPPRESSION	IBC 903.2	NONE
FIRE DETECTION	IBC 907.2	YES
MAX. TRAVEL DIST. (B)	IBC TABLE 1017.2	200'-0" MAX. W/OUT AUTOMATIC SPRINKLER SYSTEM
DEAD END CORRIDOR (B)	IBC 1020.4	(B) = 20' W/OUT AUTOMATIC SPRINKLER SYSTEM
NUMBER OF EXITS (B)	IBC TABLE 1006.2.1	SINGLE EXIT ALLOWED IF: <49 OCCUPANTS & 75'-0" MAX TRAVEL DISTANCE.
2 OR MORE EXITS	IBC 1007.1.1	WHERE 2 EXITS ARE REQUIRED THE DISTANCE BETWEEN THEM SHALL BE NO LESS THAN ½ THE OVERALL DIAGONAL



N

1 REFERENCE PLAN - FIRST FLOOR
SCALE: 1/4"=1'-0"

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT
MATTHEW D WITTEN
037334
STATE OF NEW YORK

02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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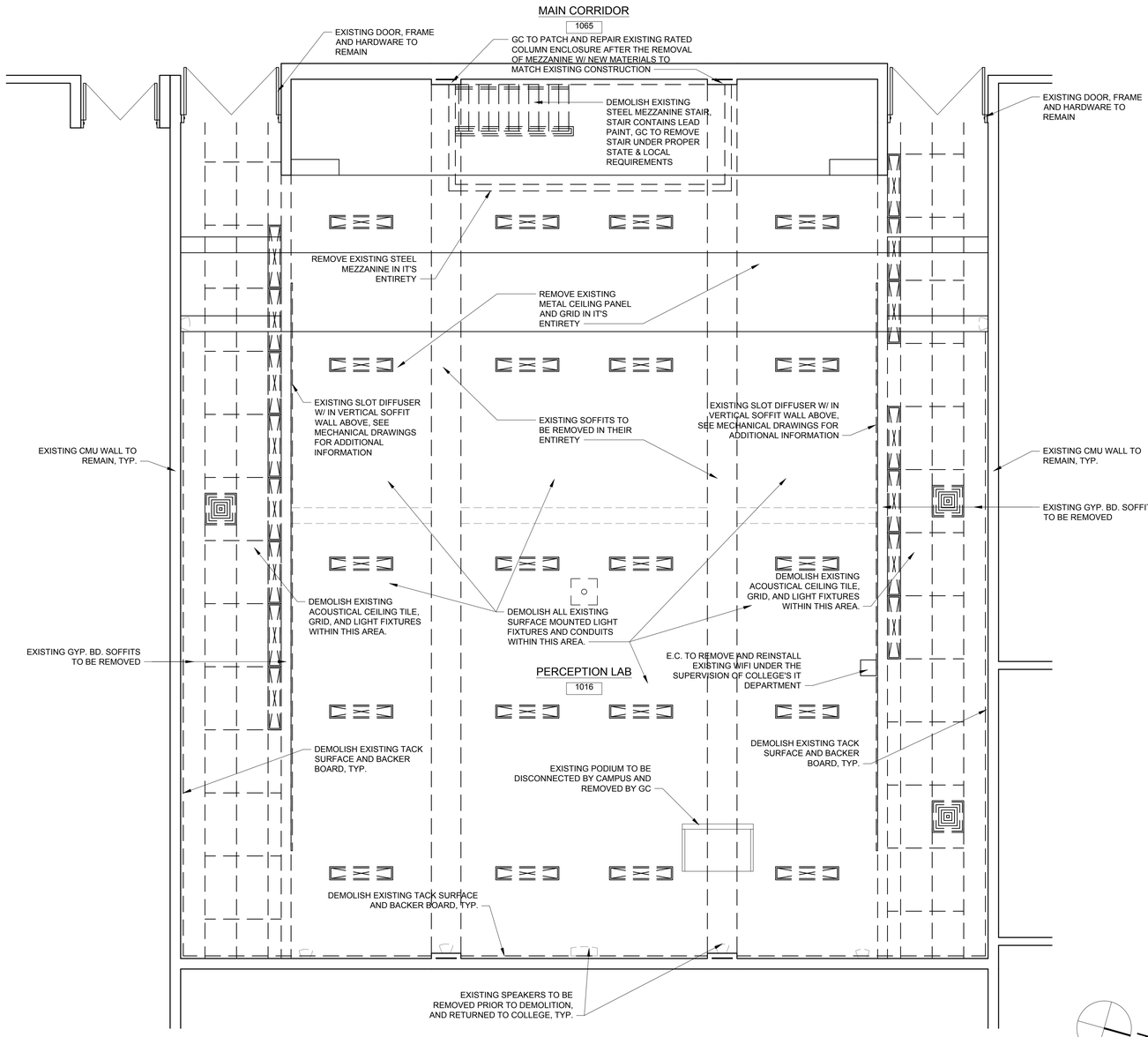
DRAWING NAME
FIRST FLOOR CODE & REFERENCE PLAN

DRAWING NO.
G101

DEMOLITION GENERAL NOTES
1. GC TO REFERENCE MEP DRAWINGS FOR ADDITIONAL DEMO NOTES.



1 PARTIAL DEMOLITION FLOOR PLAN
Scale: 1/4" = 1'-0"

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT
MATTHEW D WITTE
37334
STATE OF NEW YORK
2/11/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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DRAWING NAME
DEMOLITION FLOOR PLAN

DRAWING NO.
AD101

FINISH PLAN GENERAL NOTES

1. PAINT ALL DOOR FRAMES AND DOORS WITH GLOSS, COLOR TO MATCH BUILDING STANDARD.
2. PAINT HAND RAILS TO MATCH DOOR FRAMES.
3. PAINT ALL WALLS, EGGSHELL DECORATORS WHITE BY BENJAMIN MOORE.

CONSTRUCTION LEGEND

NEW RAISED FLOOR

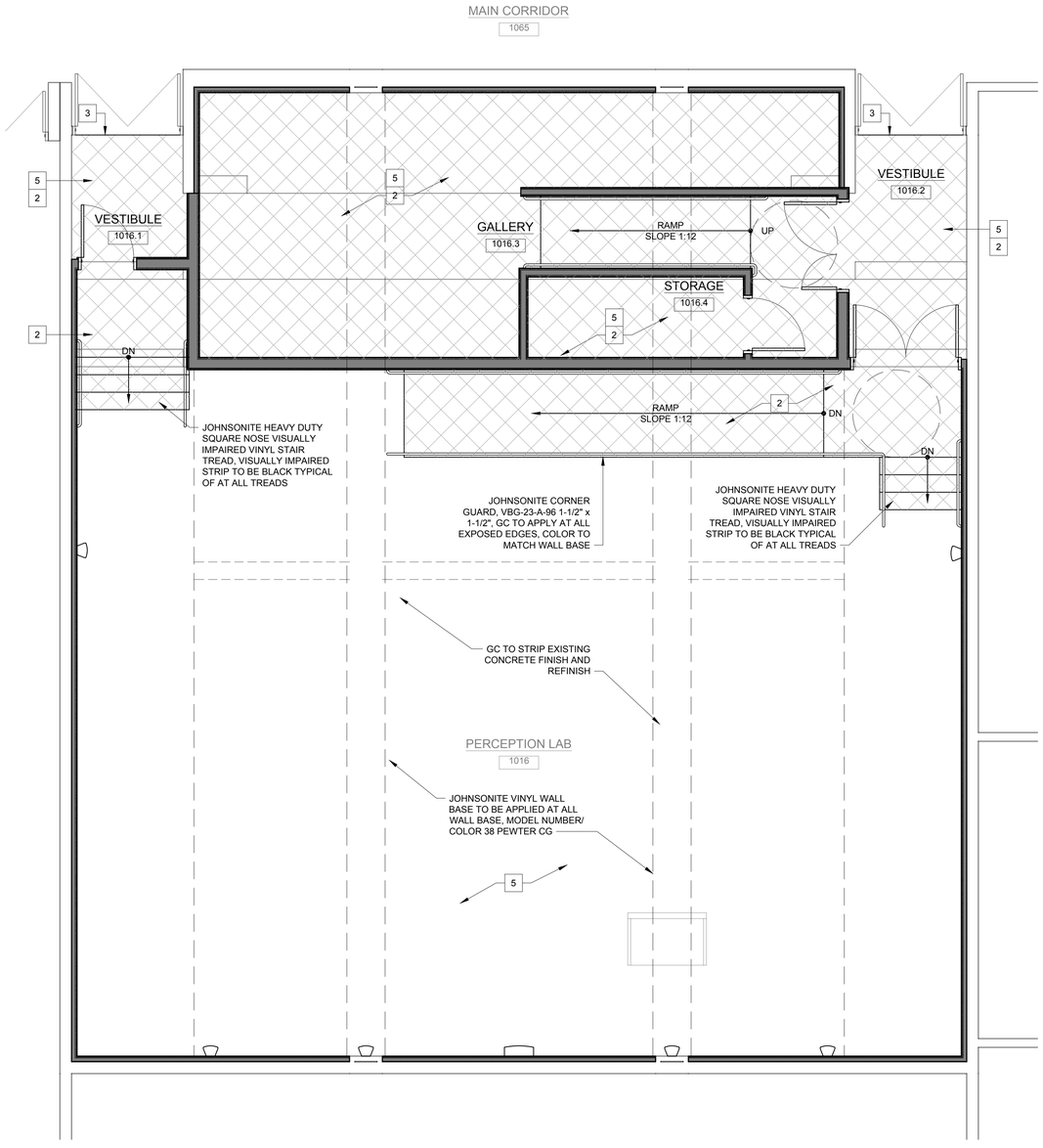
JOHNSONITE IQ OPTIMA VINYL FLOORING, 12 X 24, COLOR TO BE OPTIMA CHIMNEY SWEEP

CONSTRUCTION PLAN CODED NOTES

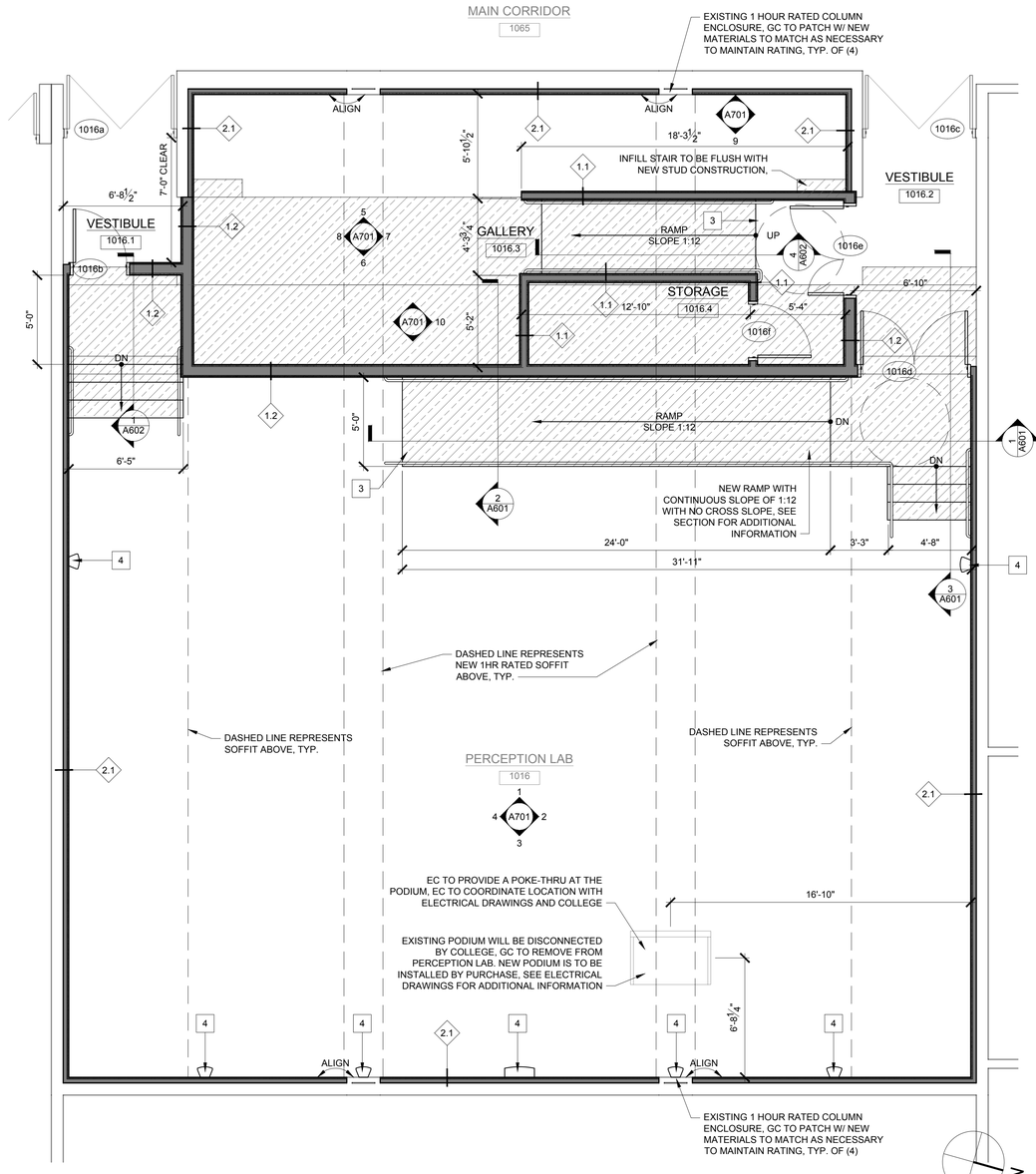
1. EXISTING CONCRETE FLOOR TO REMAIN, GC TO CLEAN AND EPOXY FLOOR TO LIKE NEW CONDITION.
2. NEW VCT TILE FLOORING.
3. NEW FLOOR TRANSITION STRIP.
4. NEW SPEAKER TO BE MOUNTED TO NEW WALL PROVIDE WOOD BLOCKING AS NEEDED FOR MOUNTING. EC COORDINATE LOCATION WITH CAMPUS, SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
5. JOHNSONITE VINYL WALL BASE TO BE APPLIED AT ALL WALL BASE, MODEL NUMBER/ COLOR 38 PEWTER CG

CONSTRUCTION PLAN GENERAL NOTES

1. GC TO VERIFY ALL DIMENSIONS.
2. EACH SUB CONTRACTOR IS RESPONSIBLE FOR PROVIDING PROPER PROTECTION AGAINST DAMAGE TO FIXTURES, FURNITURE, ADJACENT FINISHED WORK, FLOORING, ETC. FROM HIS OWN WORK.
3. PREPARE & CLEAN EXISTING SLAB TO RECEIVE FLOORING ADHESIVE FOR A FLUSH, SMOOTH FINISH.
4. ENTIRE SUB-FLOOR TO BE FLAT, SMOOTH, LEVEL & READY TO CEVEIVE NEW FLOORING.
5. ALL FINISHED FLOORING TO BE PROTECTED BY G.C. FOLLOWING INSTALLATION.
6. USE ONLY MANUFACTURERS REQUIRED ADHESIVES AND SEALANTS FOR ALL INTERIOR FINISHES. ALL ADHESIVES USED ARE TO BE ENVIRONMENTALLY SAFE AND CONTAIN NO SOLVENTS, ALCOHOL, GLYCOL, AMMONIA OR CARCINOGENS AND MUST BE A LOW V.O.C. PRODUCT.
7. ALL FLOOR FINISHES TO EXTEND TO MEET WALL.
8. FLOORING AND BASE TO EXTEND INTO STORAGE ROOM.
9. PROVIDE METAL TRANSITION STRIPS AT ALL CHANGE IN FLOORING AND EXPOSED EDGES OF FLOOR FINISH.



2 FINISH PLAN
Scale: 1/4" = 1'-0"



1 LAYOUT FLOOR PLAN
Scale: 1/4" = 1'-0"

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
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MATTHEW D WITTE
37334
STATE OF NEW YORK

02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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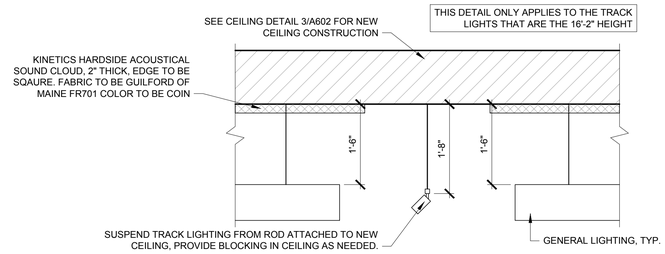
DRAWING NAME
LAYOUT FLOOR PLAN

DRAWING NO.
A101



3 TRACK LIGHT DETAIL

Scale: 3/4" = 1'-0"

CEILING KEY PLAN

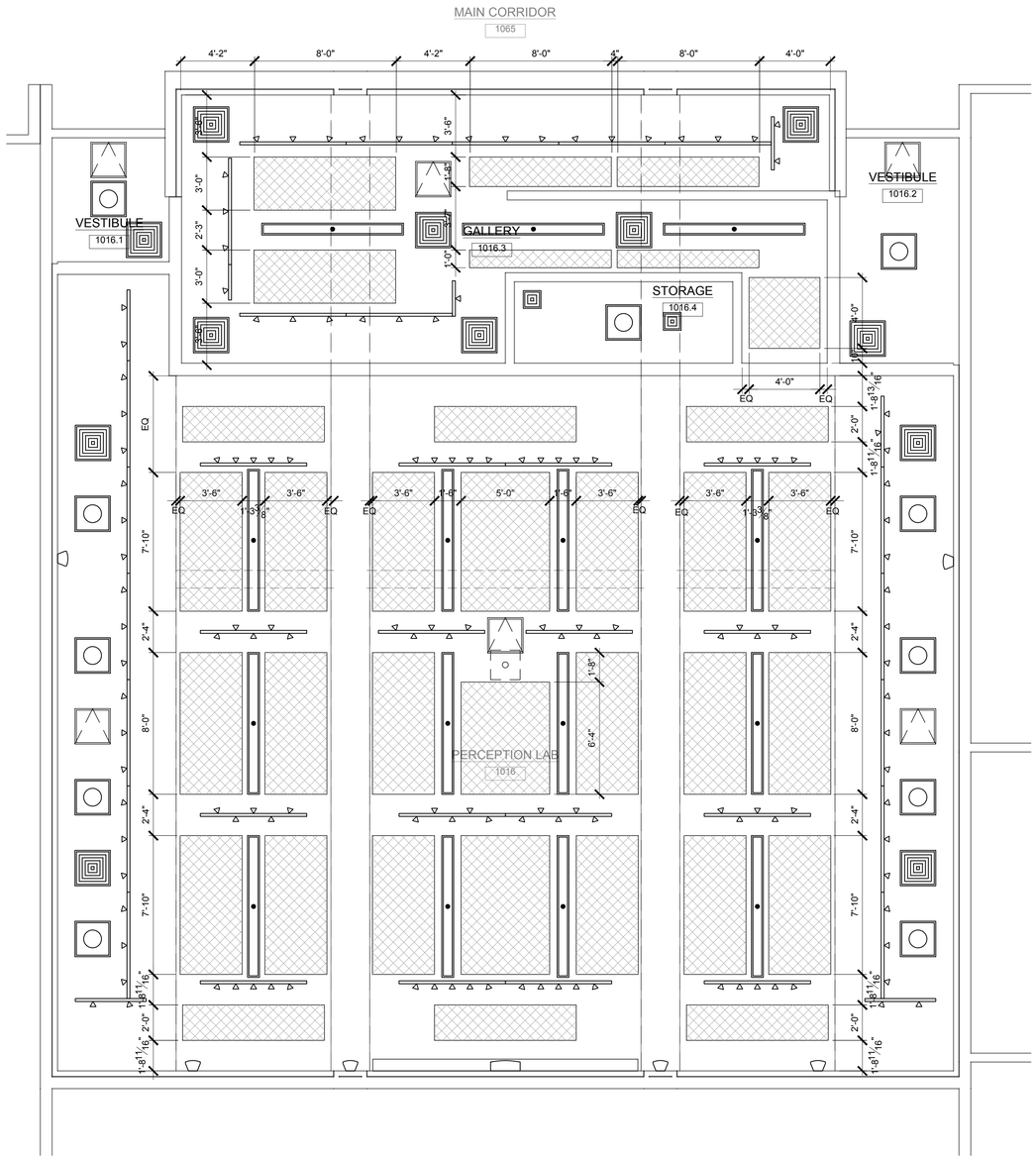
- 2x2 LED FIXTURE
- SUPPLY/ RETURN GRILL
- NEW GYPSUM BOARD CEILING
- MOVABLE TRACK LIGHTING PHILLIPS OMNISPOT LED NARROW FLOOD, MOUNT FLUSH TO CEILING UNLESS OTHERWISE NOTED
- PENDANT LIGHT - FINELITE - FL_HP4_ID_TS
- KINETICS HARDSIDE ACOUSTICAL SOUND CLOUD, 2" THICK, EDGE TO BE SQUARE FABRIC TO BE GUILFORD OF MAINE FR701, COLOR TO BE COIN
- NYSTROM RENOVATION ACCESS DOOR

CEILING PLAN CODED NOTES

1. NOT USED.
2. 2'-0" X 2'-0" CEILING ACCESS DOOR.
3. NEW CEILING, 1 HOUR RATED BEAM ENCLOSURE, UL #N501
4. NEW GYP. BD. CEILING
5. NEW PROJECTOR TO BE INSTALLED IN THE SAME LOCATION OF EXISTING PROJECTOR. PROVIDE WOOD BLOCKING ABOVE CEILING AS NEEDED FOR PROJECTOR MOUNT. V.I.F. THE LOCATION OF EXISTING PROJECTOR AND MATCH. PROJECTOR TO BE INSTALLED BY OTHERS, SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
6. SUSPENDED TRACK FROM CEILING, SEE DETAIL 3/A201

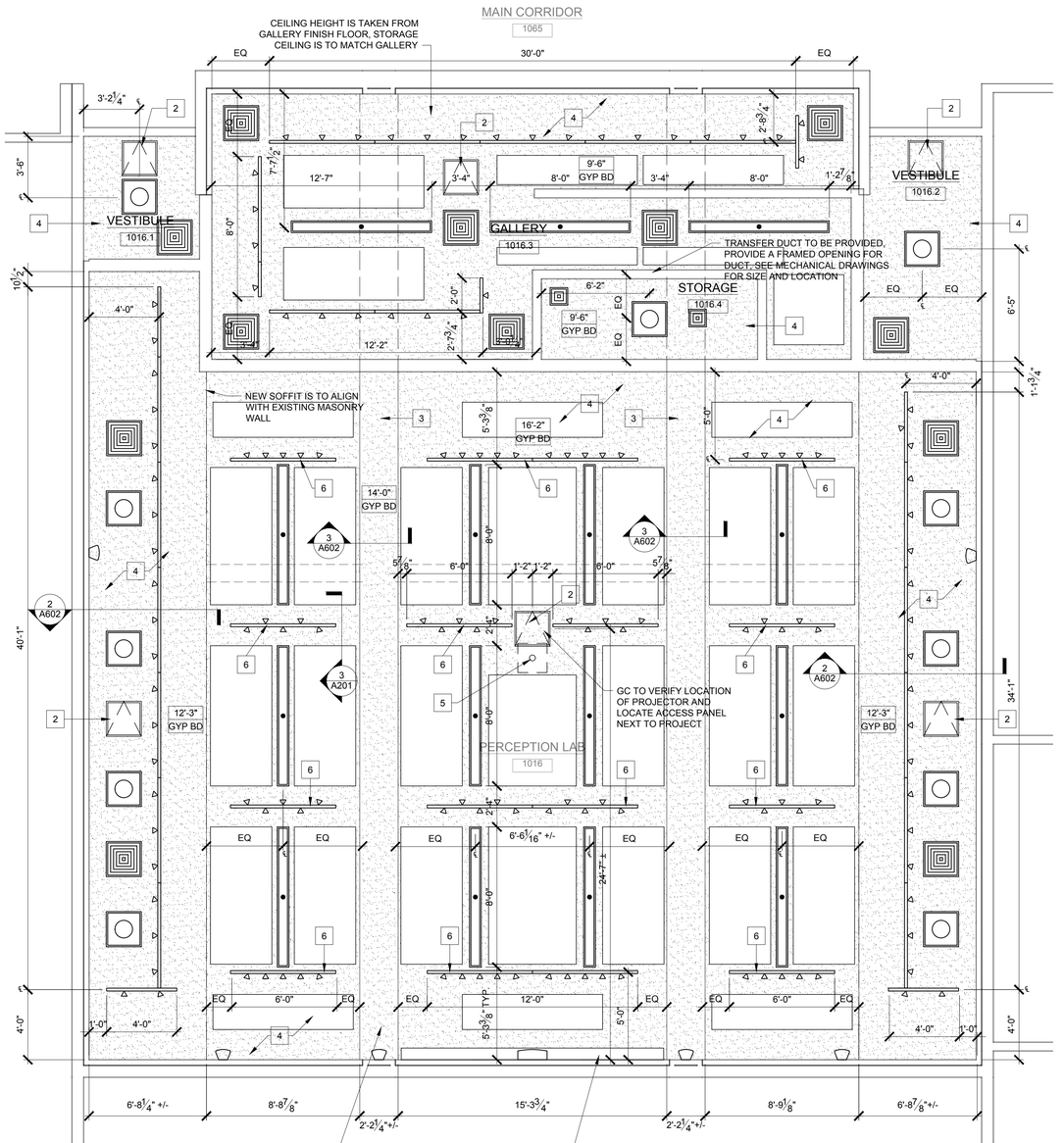
CEILING PLAN GENERAL NOTES

1. ALL GYP. BD. CEILING TO BE PAINTED WHITE.
2. ALL LABELED CEILING HEIGHTS SHALL BE MEASURED FROM THE FINISHED FLOOR ELEVATION OF THAT LEVEL.
3. GC TO COORDINATE EXISTING SMOKE ALARMS AND DETECTORS WITH ACOUSTIC PANELS, SEE FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
4. EC TO COORDINATE ANY IT/AV RELATED ITEMS WITH COLLEGE. SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
5. FINAL LOCATION OF ALL CEILING ELEMENTS TO BE DETERMINED IN FIELD. GC TO COORDINATE WITH OTHER TRADES



2 ACOUSTIC PANEL LAYOUT

Scale: 1/4" = 1'-0"



1 CEILING CONSTRUCTION PLAN

Scale: 1/4" = 1'-0"

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT MATTHEW D WITHEY 37334 STATE OF NEW YORK
02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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DRAWING NAME
REFLECTED CEILING PLAN

DRAWING NO.
A201

DOOR GENERAL NOTES:

1. ALL DOOR HARDWARE SHALL COMPLY WITH FEDERAL AND STATE ACCESSIBILITY REQUIREMENTS.
2. ALL EXIT DOORS TO BE OPENABLE FROM INSIDE WITHOUT USE OF A KEY, SPECIAL KNOWLEDGE OR EFFORT.
3. THE MAXIMUM FORCE REQUIRED TO OPERATE ANY DOOR SHALL COMPLY AS FOLLOWS:
   - 3.• INTERIOR DOORS = 5LBS
   - 3.• FIRE-RATED DOORS = MINIMUM ALLOWABLE BY APPROPRIATE ADMINISTRATIVE AUTHORITY.
4. ALL HANDLES AND PULLS TO BE INSTALLED AT 39" A.F.F. TO CENTERLINE.
5. DOOR HARDWARE SPECIFICATIONS:
   - 5.• DOOR LOCKSET AND LATCH SETS SHALL COMPLY WITH ANSI/BHMA A156.2.
   - 5.• DOOR CLOSERS SHALL COMPLY WITH ANSI/BHMA A156.4.
   - 5.• ALL HINGES SHALL COMPLY WITH ANSI/BHMA A156.1.
   - 5.• ALL DOOR STOPS SHALL COMPLY WITH ANSI/BHMA A156.16, GRADE 1.
   - 5.• ALL KICK PLATES SHALL BE 10" TALL UNLESS OTHERWISE NOTED.
6. DOOR SPECIFICATIONS:
   - 6.• SPECIFIED TOP AND BOTTOM BOLTS AND PANIC RELEASE LATCH SHALL BE INSTALLED ON INACTIVE DOOR LEAF ONLY.
7. RELOCATE EXISTING CARD READER FROM DOOR 1016a TO DOOR 1016c
8. SEE DOOR SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. GC SHALL VERIFY ALL EXISTING CONDITIONS AND CONFIRM WORKING ORDER. GC SHALL NOTIFY ARCHITECT IF EXISTING CONDITIONS DIFFER FROM THAT IDENTIFIED WITH IN DOOR SCHEDULE.

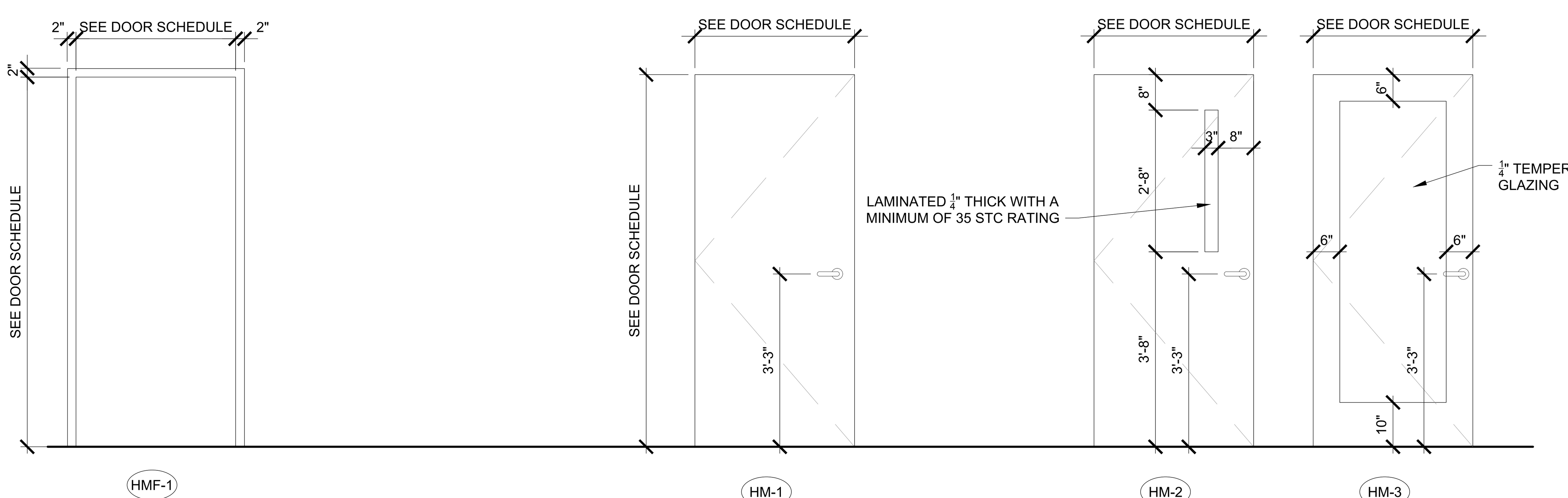
DOOR SCHEDULE

DOOR ID	ROOM NAME	DOOR		FRAME				FIRE RATING				HARDWARE-SEE SPECIFICATIONS: FIRECODE REQ.					HARDWARE-SEE SPECIFICATIONS: DISABLED REQ.					HARDWARE-SEE SPECIFICATIONS: LOCKSET						HARDWARE-SEE SPECIFICATIONS: MISC. HARDWARE												REMARKS
		DOOR MATERIAL- TYPE (SEE DOOR ELEVATIONS)	DOOR SIZE (WxH)	FRAME MATERIAL- TYPE (SEE FRAME ELEVATION)	DETAIL NUMBER: HEAD DETAIL	DETAIL NUMBER: JAMB DETAIL	DETAIL NUMBER: SADDLE DETAIL	SIXTY MINUTES	FORTY FIVE MINUTES	TWENTY MINUTES	NOT REQUIRED	PANIC RELEASE LATCH	POSITIVE LATCHING	AUTOMATIC CLOSER	DELAYED ACTION CLOSER	180° SWING	LEVER HANDLES	TACTILE WARNING	ACCESSIBLE THRESHOLD	KICK PLATE	PUSH PLATES	PRIVACY	PASSAGE	CLASSROOM	OFFICE	STORAGE	ENTRY	VERTICAL RODS	PULLS	FULL PERIMETER WEATHERSTRIPPING	TOP AND BOTTOM BOLTS	STRIKE	SILENCERS	BUTTS	METAL PROTECTIVE TRIM PLATE	WALL MOUNTED DOOR STOP	HOLD OPEN	CARD READER	HANDICAP ASSISTED OPEN	
	FIRST FLOOR																																							
1016a	VESTIBULE A	HM-1	3'-0" x 7'-0" (2) V.I.F.	EXIST.	EXIST.	EXIST.	--	○				○	○	○			○							○						●	○	○	○	○		○	○			GC TO VERIFY ALL EXISTING HARDWARE
1016b	PERCEPTION LAB	HM-2	3'-0" x 7'-0"	HMF-1	H1/A501	J1-J2/A501	--				●	●	●	●			●						●							●		●	3	1.5		●				
1016c	VESTIBULE B	HM-1	3'-0" x 7'-0" (2) V.I.F.	EXIST.	EXIST.	EXIST.	--	○				○	○	○			○							○						●	○	○	○	○		○	○	⊕		GC TO VERIFY ALL EXISTING HARDWARE
1016d	VESTIBULE B	HM-2	3'-0" x 7'-0" (2)	HMF-1	H1/A501	J1-J2/A501	--				●	●	●	●			●							●						●	●	●	2	3		●				
1016e	GALLERY	HM-3	3'-0" x 7'-0" 2'-0" x 7'-0"	HMF-1	H1/A501	J1/A501	--				●		●				●							●							●	●	2	3		●	●			
1016f	STORAGE	HM-1	3'-0" x 7'-0"	HMF-1	H1/A501	J1/A501	--				●		●				●									●						●	3	1.5		●				

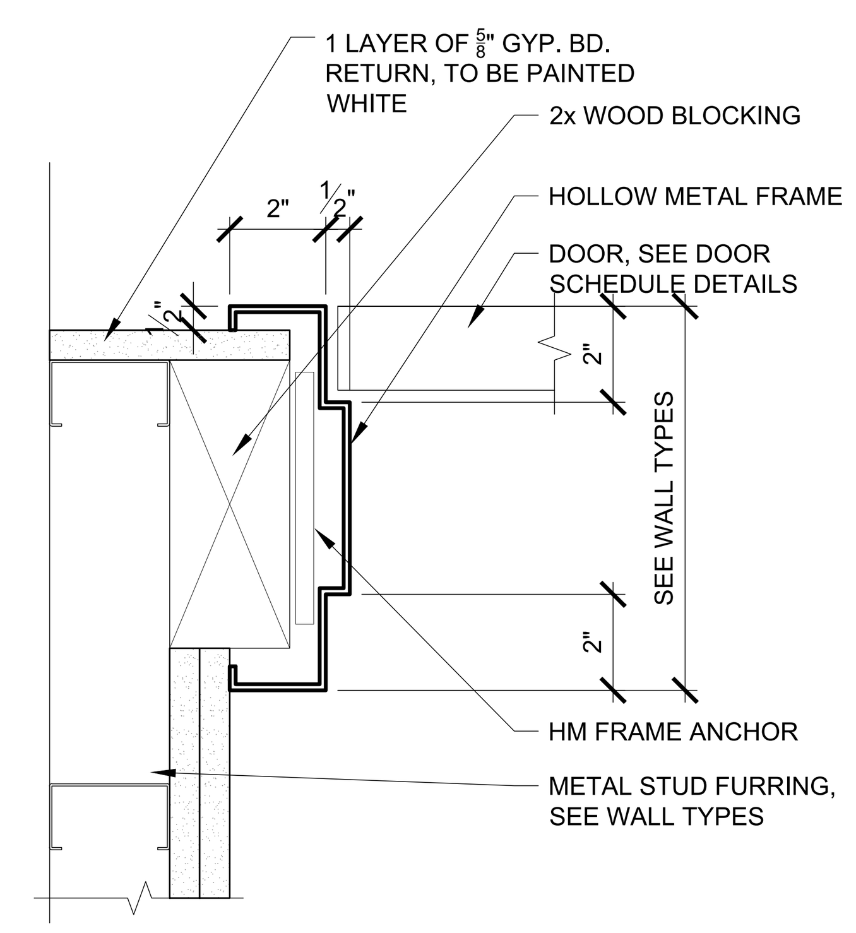
● INDICATES REQUIRED WORK

○ INDICATES EXISTING

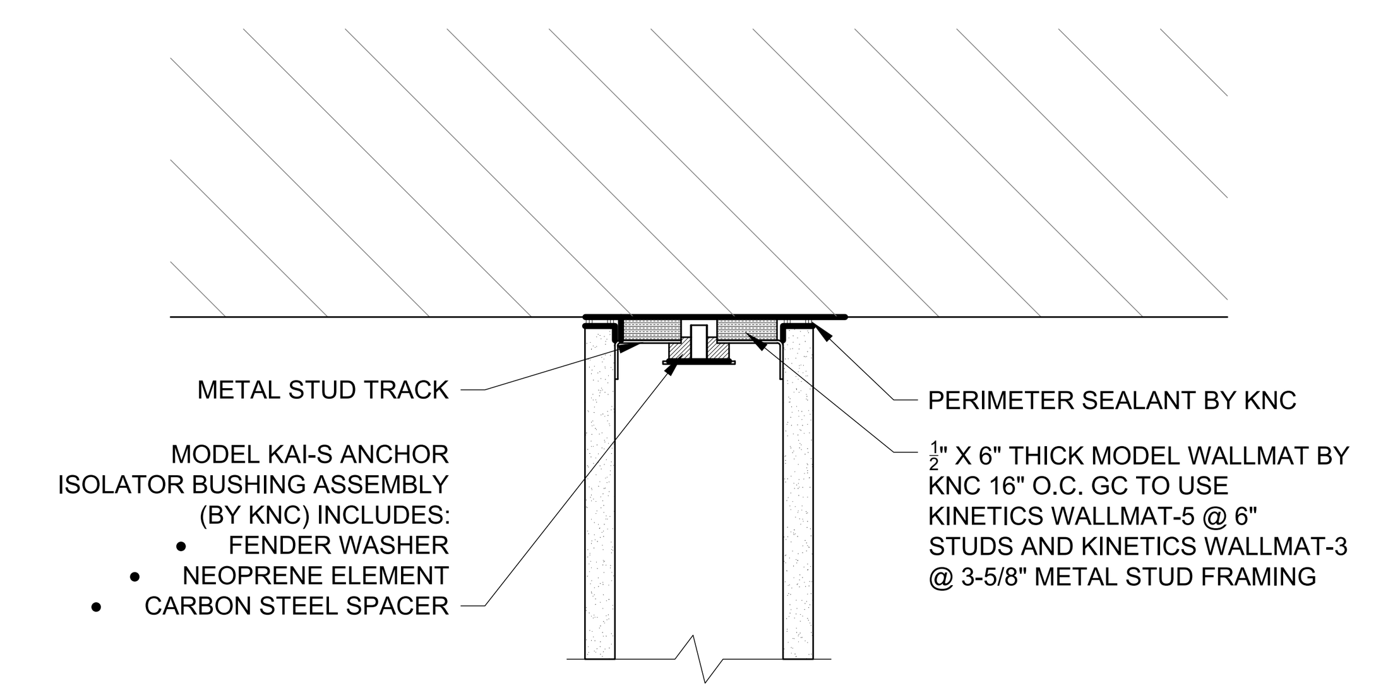
⊕ INDICATES REUSE RELOCATED EXISTING



2 DOOR AND FRAME TYPES
Scale: 1" = 1'-0"



J2 DOOR JAMB
Scale: 3" = 1'-0"



1A TOP WALL TRACK
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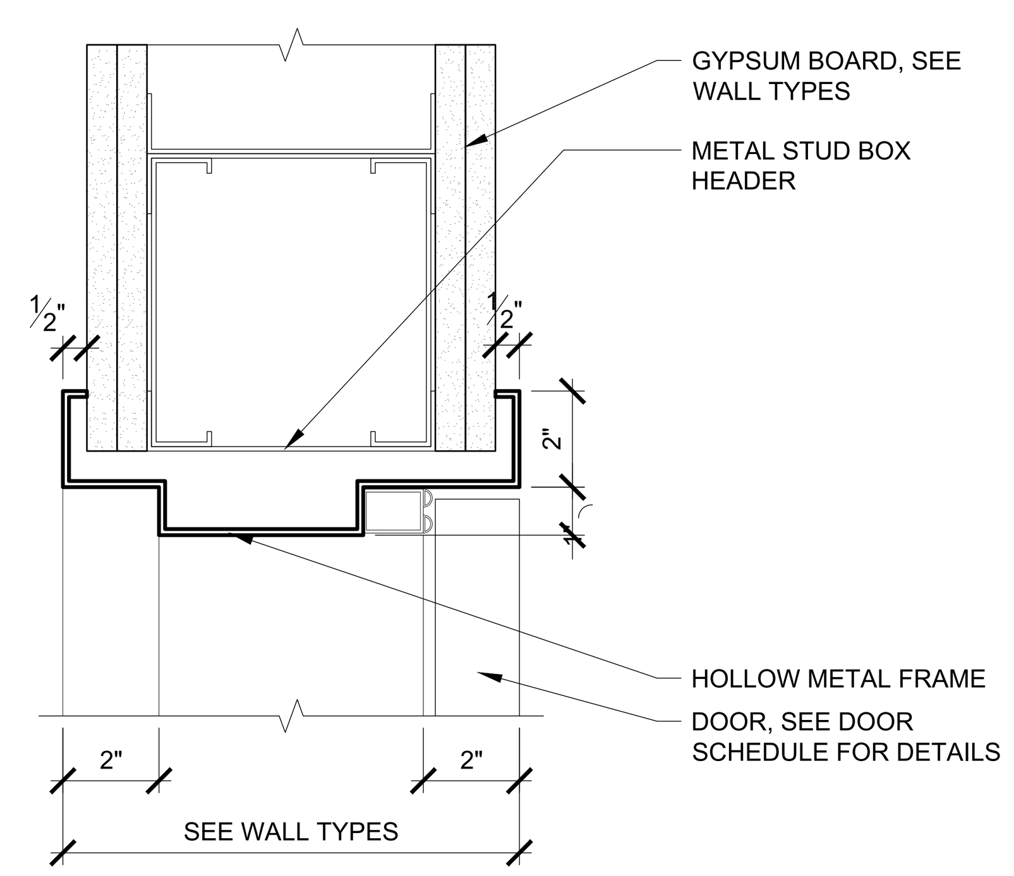
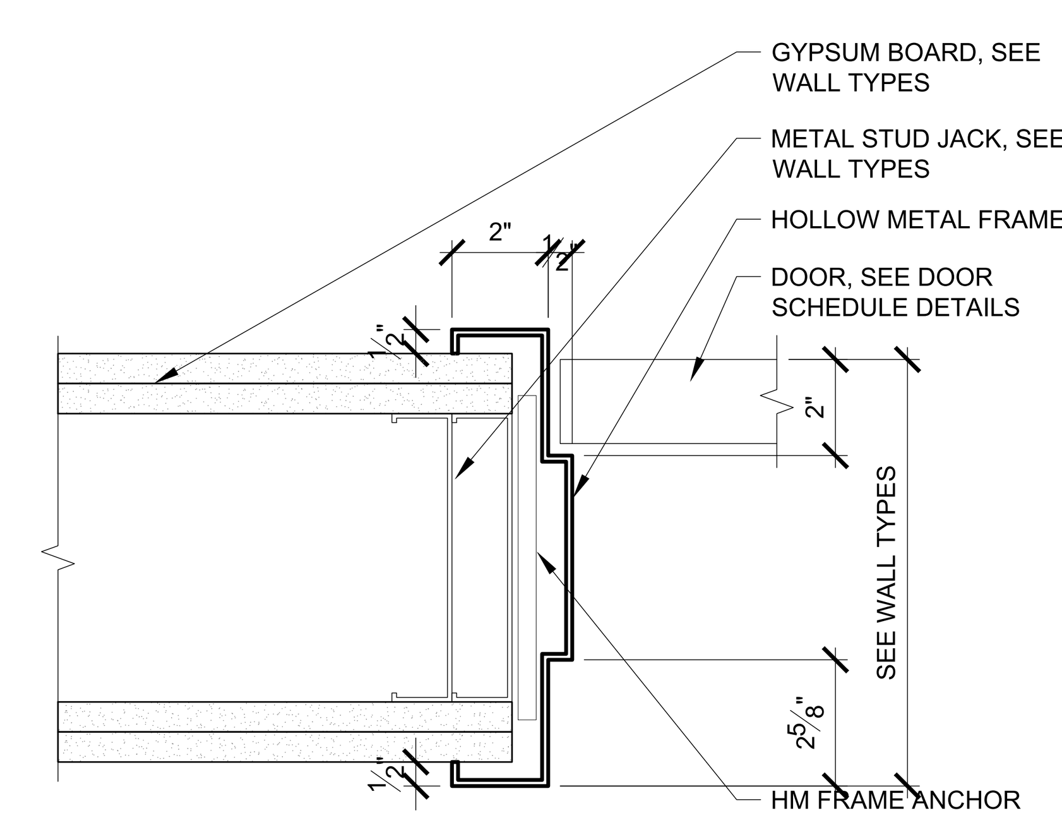
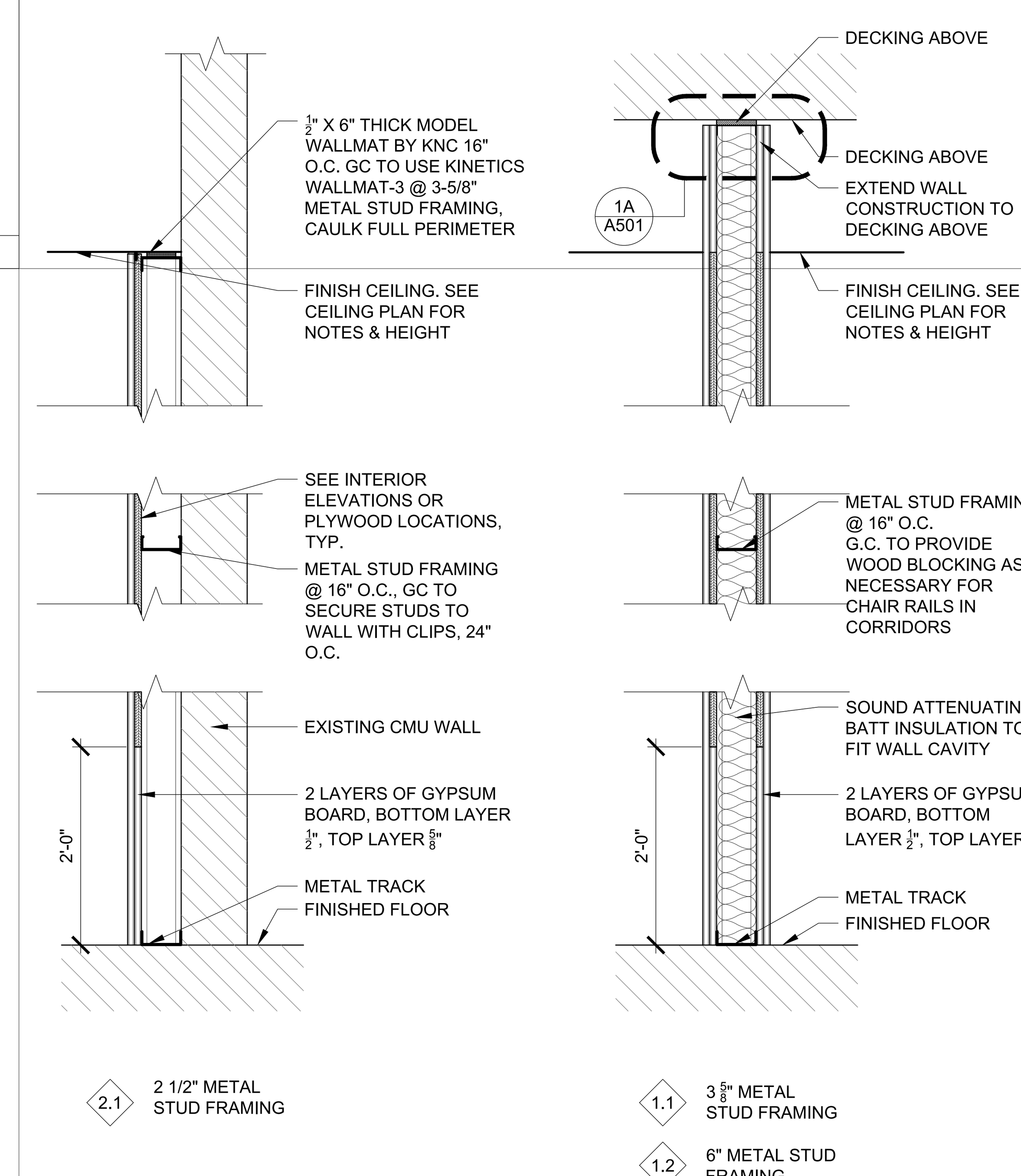


H1 DOOR HEAD
Scale: 1" = 1'-0"



J1 DOOR JAMB
Scale: 3" = 1'-0"



2.1 2 1/2" METAL STUD FRAMING

1.1 3 ⅝" METAL STUD FRAMING

1.2 6" METAL STUD FRAMING

1 WALL TYPES
Scale: 1" = 1'-0"

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PROJECT

SUNY PURCHASE COLLEGE
VISUAL ARTS PERCEPTION LAB RENOVATION
735 ANDERSEN HILL RD
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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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DRAWING NAME

WALL TYPES/DOOR DETAILS/ DOOR SCHEDULE

DRAWING NO.

A501

HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal frames.

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

a. Hager Companies.
b. McKinney Products Company; an ASSA ABLOY Group company.
c. Stanley Commercial Hardware.
d. Approved Equivalent

2. Mounting: Full mortise (butts).

BHMA A156.1 defines antifriction bearing as having a bearing material between various moving parts of a hinge. Manufacturers use various antifriction bearing materials including ball bearings, oil-impregnated bearings, and nylon. NFPA 80 requires antifriction bearing surfaces that comply with BHMA A156.1 for hinges used on fire-rated door assemblies.

3. Bearing Material: Ball bearing.
4. Grade: Grade 1 (heavy weight).
5. Base and Pin Metal:
a. Exterior Hinges: Stainless steel with stainless-steel pin.
b. Interior Hinges: Steel with steel pin.
c. Hinges for Fire-Rated Assemblies: Steel with steel pin.
6. Pins: Non-rising loose, unless otherwise indicated.

Retain one or both of first two subparagraphs below with first option in subparagraph above.

a. Outswinging Exterior Doors: Nonremovable.
b. Outswinging Corridor Doors with Locks: Nonremovable.

7. Tips: Flat button.
8. Corners: Square.

Reverse safety studs and safety studs are only available on full-mortise hinges.

Delete paragraph and subparagraphs below if only continuous geared hinges are required or if quantity is included in door hardware sets.

Insert sizes, including hinge height and metal thickness, only if they are not included in door hardware sets.

Delete first paragraph and subparagraphs below if requirements are indicated in door hardware sets.

Delete first paragraph and subparagraphs below if not required. Electrified functions are available only for full-mortise, pivot-reinforced, and pivot hinges and for continuous geared hinges.

B. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.

MECHANICAL LOCKS AND LATCHES

A. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13, Grade 1, Series 1000, heavy-duty.

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

a. Best Access Systems, Div. of The Stanley Works; Series 45H.
b. Corbin Russwin Architectural Hardware, an ASSA ABLOY Group company; Series ML2000.
c. SARGENT Manufacturing Company, an ASSA ABLOY Group company; Series 8200.
d. Schlage Commercial Lock Division, an Allegion Company; Series L.
e. Approved Equivalent

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Mortise Locks: Minimum 3/4-inch latchbolt throw.

C. Lock Backset: 2-3/4 inches.

Generally retain first option in first paragraph below for private projects; retain third option for Federal, State, and local government projects. Second option is often referenced by building codes. Verify requirements with authorities having jurisdiction.

Revise first paragraph and subparagraphs below if more than one type of lock trim is needed.

D. Lock Trim:

Most levers in first subparagraph below are cast.

1. Levers: Solid brass, bronze or stainless steel; cast or forged and through-bolted with a 2-piece spindle.

a. Provide tactile warning at hazardous locations.

2. Escutcheons (Roses): Wrought.
3. Dummy Trim: Match lever lock trim and escutcheons.

Retain first option in subparagraph below if BHMA standards are used to specify door hardware and lock design is indicated on Drawings.

4. Lockset Designs: Provide design indicated or, if sets are provided by another manufacturer, provide designs that match those designated.

E. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

Delete subparagraphs below not required.

2. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
3. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
4. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
5. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

F. Electrified Mortice Lock Set (as scheduled): Types and functions indicated as follows:

Select required functions from subparagraphs and associated subparagraphs below. Verify availability of products with manufacturers selected.

1. Request-for-Exit Function: Signal initiated when push bar is actuated.
2. Electric Latch Retraction: Remote signal activates continuous-duty solenoid that retracts latch.
3. Power supplies: Furnished by Door Hardware supplier; installed by the Security Contractor.
4. Harness connector per Security Contractors requirements.
5. Configured for fail secure operation.

AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

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

a. Glynn-Johnson.
b. Hager Companies.
c. IVES Hardware.
d. Trimco.
e. Approved Equivalent

B. Automatic Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically retract when active leaf is opened and that automatically engage when active door depresses bolt trigger; listed and labeled for fire-rated doors. Provide brass or stainless-steel cover plate, top and bottom dustproof strikes, guides, guide supports, wear plates, and shims.

C. Dustproof Strikes: Locking type, Grade 1, polished wrought brass, with 3/4-inch- diameter, spring-tension plunger.

EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

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

a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company; 5000 Series.
b. Precision Hardware, Inc.; 1100/D-1200 Series.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company; 80 Series.
d. Von Duprin; an Allegion Company; 98/99 Series.
e. Approved Equivalent

Generally retain first option in first paragraph below for private projects; retain third option for Federal, State, and local government projects. Second option is often referenced by building codes. Verify requirements with authorities having jurisdiction.

Retain one of two paragraphs below, or both. Only fire exit devices may be used for fire doors. NFPA 80 distinguishes between panic exit hardware and fire exit hardware. See the Evaluations in Division 8 Section "Door Hardware."

B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

UL test in paragraph below includes operational test of 100,000 cycles. BHMA A156.3 requires 250,000 cycles for Grade 1 and 100,000 cycles for Grade 2.

C. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

Delete first paragraph below if removable mullions are specified with door frames in other Division 8 Sections.

Retain paragraph and subparagraph below if exit device levers, knobs, and pulls are required to match lockset and latchset designs. Matching locksets to exit device trim and levers limits the design options available; coordinate with lock design selected in "Locks and Latches, General" Article.

D. Outside Trim: Lever with cylinder; material, design and finish to match locksets, unless otherwise indicated.

1. Provide forged or cast escutcheon plates.
2. Provide knurled outside lever where scheduled.

Retain paragraph below if physical abuse is a design consideration.

Coordinate paragraph and list below with Part 2 "Scheduled Door Hardware" Article. Retain "Available" for nonproprietary and delete for semiproprietary specifications.

E. Provide the following types of exit devices as scheduled:

1. Rim Exit Devices:

a. Type: BHMA A156.3, Type 1, rim.
b. Actuating Bar: Push pad.
c. Material: Brass, Bronze, Stainless steel or Aluminum.

2. Push Pad: Extend push pad a minimum of one-half of the door width. Provide flush mounted end cap with two-point attachment to the door.
3. Provide the following for each device:

a. Nylon bearings and stainless steel springs.
b. Security dead latching feature.
c. Spacers as required for flush mounting of mechanism case.
d. Glass bead kits for mounting of hardware on glass doors.

4. Provide all non-fire-rated exit devices with cylinder dogging, except at locations indicated with electric latch retraction or request-for-exit function.

F. Electrified Exit Device Options (as scheduled): Types and functions indicated as follows:

Select required functions from subparagraphs and associated subparagraphs below. Verify availability of products with manufacturers selected.

1. Request-for-Exit Function: Signal initiated when push bar is actuated.
2. Electric Latch Retraction: Remote signal activates continuous-duty solenoid that retracts latch.
3. Power supplies: Furnished by Door Hardware supplier; installed by the Security Contractor.
4. Harness connector per Security Contractors requirements.
5. Configured for fail secure operation.

LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. All locksets and cylinders shall be keyed into the existing Campus Master Key System for this project. Allow for 100% expansion. For the protection of the Campus, all cylinders shall be keyed at the factory where permanent records shall be established and maintained.
2. Manufacturers: Subject to compliance with requirements provided products by one of the following.

a. Best Core
b. Approved Equal.
c. Approved Equivalent

Revise first paragraph below to specify manufacturers' proprietary cylinder systems.

B. Cylinders: BHMA A156.5, Grade 1, manufacturer's standard tumbler type, constructed from brass, or bronze, stainless steel, or nickel silver, complying with the following:

1. Number of Pins: Seven (7) combination.
2. Bored-Lock Type: Cylinders with tailpieces to suit locks.

a. High-Security Grade: BHMA A156.5, Grade 1A, listed and labeled as complying with pick- and drill-resistant testing requirements in UL-437 (SuffixA).

3. Proprietary product to match Campus standard as follows:

a. Best Access Systems; Premium Series. (no substitution).

Select applicable types from three subparagraphs below.

Retain one of two subparagraphs below. Second describes tumbler proprietary to cylinder manufacturer.

C. Construction Keying: During construction, all new locksets shall be construction master keyed. Provide temporary construction cores. The Contractor shall receive ten (10) construction master keys. Under no circumstance shall the Contractor receive any permanent building master keys or change keys unless authorized by the Campus Representative.

1. All construction cores will be returned to General Contractor once Campus has received and installed final cores.

D. Permanent Cores: All permanent cores and keys shall be requested directly by the Campus to the manufacturer. The Contractor shall be responsible for all payments to the manufacturer and shall supply the Campus with all necessary information (account number, etc.), in order for the Campus to order final cores and keys.

KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:

1. Master Key System: Cylinders are operated by a change key and a master key.
2. Existing System: Re-key Campus' existing master key system into new keying system.
3. Keyed Alike: Key all cylinders to same change key.
4. All master keys shall be identified with a registry number, and shall not be stamped with MASTER or letter M.

Retain subparagraph below if required.

B. Keys: Nickel silver.

Delete first subparagraph and associated subparagraph below if key does not require special marking.

1. Quantity: In addition to two extra key blanks for each lock, provide the following:

Retain subparagraphs below that correspond to type of keying system selected above.

a. Cylinder Change Keys: Three.
b. Master Keys: Two.

2. All keying shall be thoroughly checked with the Campus Representative. Final keying requirements shall be submitted in writing, for final approval by the Campus Representative.

ACCESSORIES FOR PAIRS OF DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hager Companies.
2. National Guard Products.
3. Pemko Manufacturing Co.
4. Reese Enterprises.
5. Approved Equivalent

B. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.

C. Flat Overlapping Astragals: BHMA A156.22; flat zinc-plated steel metal bar, surface mounted on face of door with screws; minimum 1/8 inch thick by 2 inches wide by full height of door.

To prevent damage to astragal, retain paragraph and subparagraph below to push active leaf open when inactive leaf is opened first.

Astragals in three paragraphs below are mounted on one leaf of a pair of doors to protect against weather and to minimize passage of smoke, flame, and gases during a fire. NFPA 80 requires overlapping type for doors rated more than 1-1/2 hours. Astragals required for door listings are specified with doors in other Division 8 Sections. Only astragals controlling light and sound are included below.

SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

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

a. LCN Closers; an Allegion Company; 4000 Series.
b. Norton Door Controls; an ASSA ABLOY Group company; PR7500/PR7700.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company; 351 Series.
d. Approved Equivalent

B. Surface Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.
1. Mounting: Parallel arm, unless otherwise indicated.
2. Type: Regular arm, heavy-duty.

a. Provide delayed action closing where indicated.

If retaining delayed action closing in subparagraph above, delete adjustable backcheck in subparagraph below.

3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.

a. Where indicated, closer must operate at 180 degree opening.

4. Provide all drop plate brackets, shims and angle brackets as required to complete installation of closers on doors and frames.

OVERHEAD STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.

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

a. Burns Manufacturing Incorporated.
b. Glynn-Johnson.
c. Hager Companies.
d. IVES Hardware.
e. Rockwood Manufacturing Company.
f. Trimco.
g. Approved Equivalent

2. Provide wall stops for doors unless floor or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

B. Wall Bumpers: Grade 1; with rubber bumper; 2-1/2-inch diameter, minimum 3/4-inch projection from wall; with backplate for concealed fastener installation; with concave bumper configuration.

DOOR GASKETING

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Basis of design is as follows:

a. Zero International - Automatic drop bottom gasket (fully mortised) Zero International 369AA
b. Zero International - Jamb Applied adjustable sealing system Zero International 7770aa
c. Zero International - Astragal Seal - Two Active Leafs Zero International 55AA + 555AA
d. Approved Equivalent

AUXILIARY DOOR HARDWARE

A. Silencers for Metal Door Frames: Grade 1; neoprene or rubber; minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

B. Door closer mounting bracket: Basis of design, Zero International 770SPB

C. Approved Equivalent

AUXILIARY ELECTRIFIED DOOR HARDWARE

A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

B. Door and Frame Transfer Devices: Steel housing for mortise in hinge stile of door, with flexible tube for wiring bundle; accommodating doors that swing open to 120 degrees.

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PROJECT

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

REGISTERED ARCHITECT
MATTHEW D WITMER
37334
STATE OF NEW YORK

02/14/2019

ISSUED FOR: BID

ISSUED DATE: 02.11.2019

DRAWN BY: JW

CHECKED BY: CM

PROJECT NUMBER: 1418283

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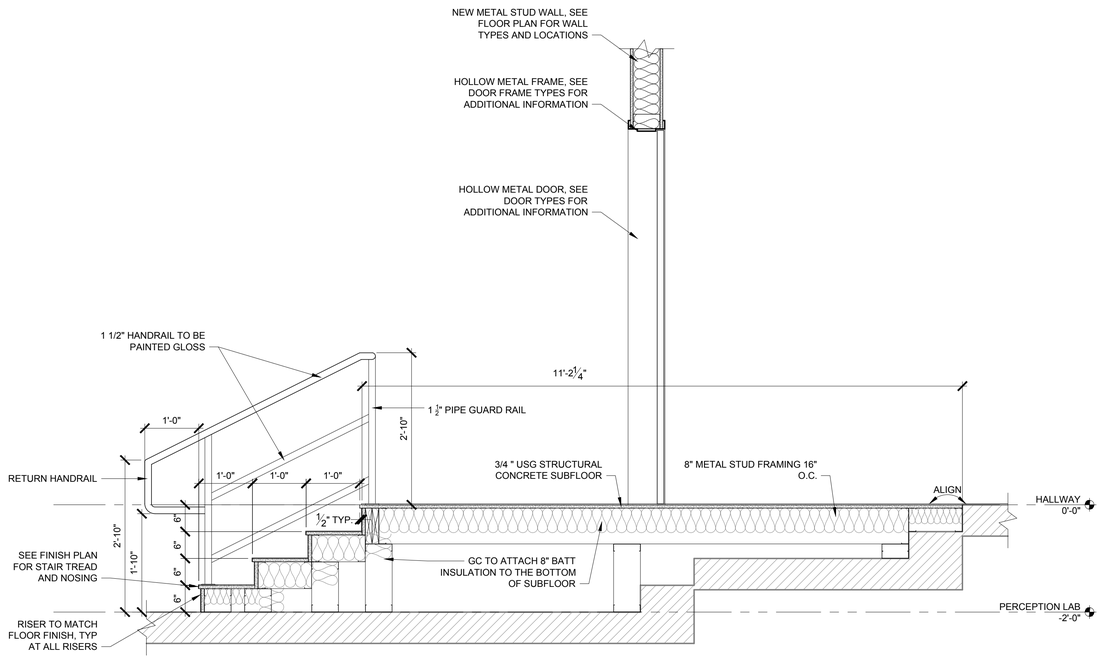
DRAWING NAME

DOOR SPECIFICATIONS

DRAWING NO.

A502



3 SECTION AT RAMP LANDING

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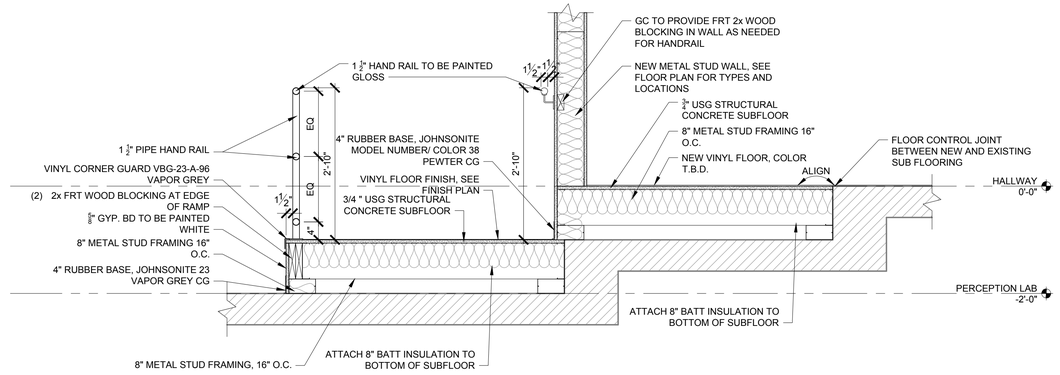
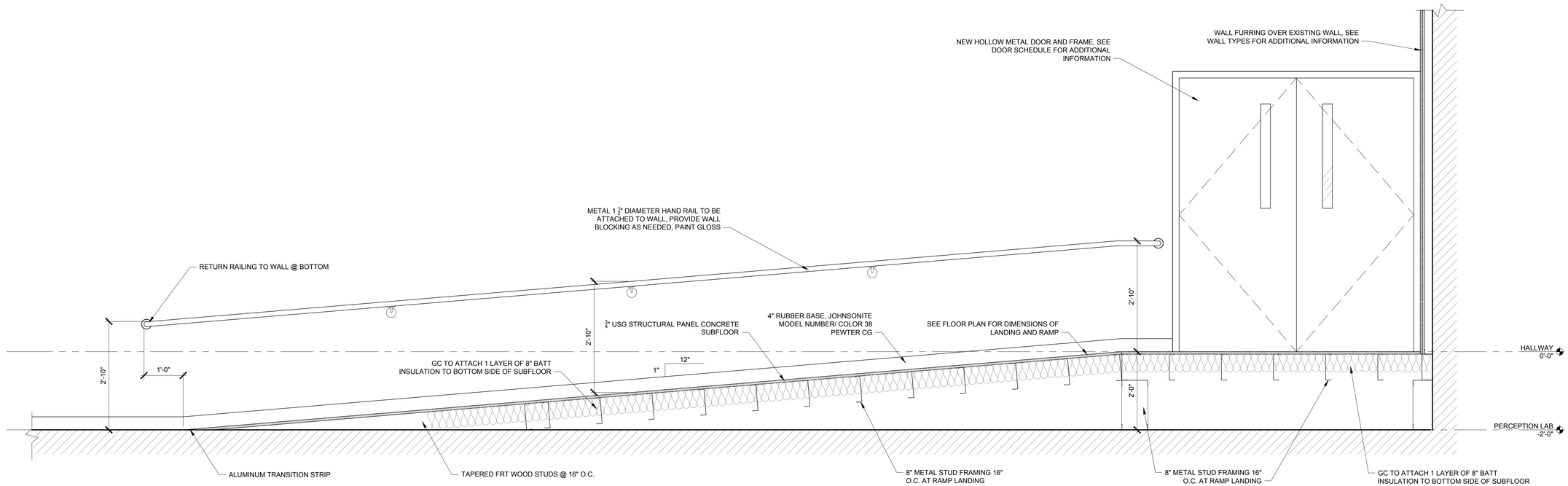


2 CROSS SECTION AT RAMP

Scale: 3/4" = 1'-0"



1 SECTION AT RAMP

Scale: 3/4" = 1'-0"

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT
MATTHEW D WITMER
37334
STATE OF NEW YORK

02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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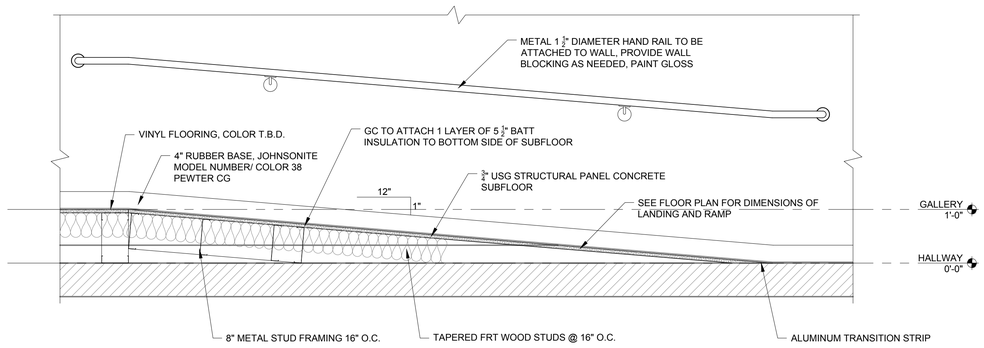
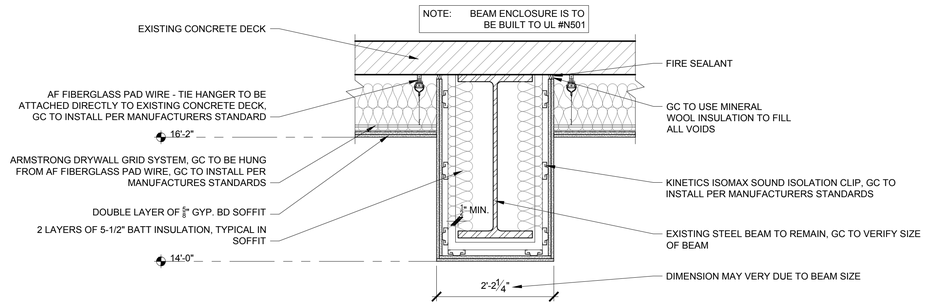
DRAWING NAME
RAMP DETAILS

DRAWING NO.
A601



4 SECTION @ RAMP IN GALLERY
Scale: 3/4" = 1'-0"



3 SECTION @ RATED SOFFIT
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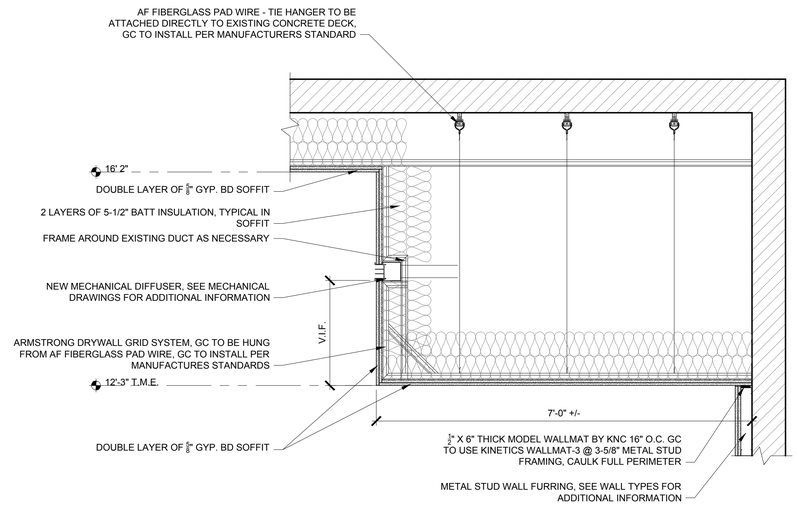

2 SECTION AT SOFFIT
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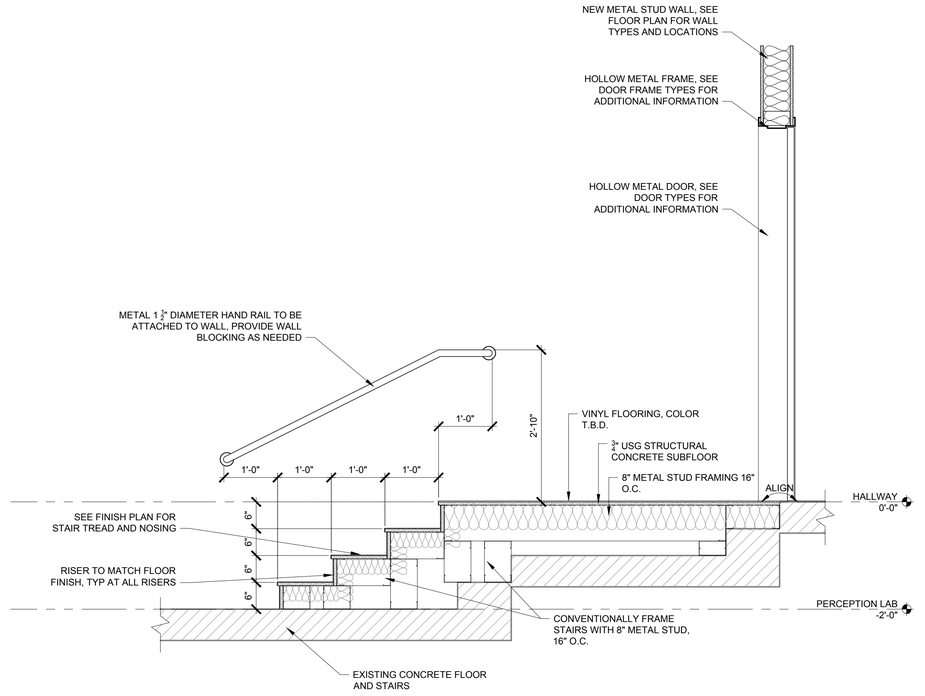

1 SECTION AT STAIRS
Scale: 3/4" = 1'-0"

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PROJECT
SUNY PURCHASE COLLEGE
VISUAL ARTS PERCEPTION LAB RENOVATION
735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL
REGISTERED ARCHITECT
MATTHEW D WITMER
37334
STATE OF NEW YORK

02/14/2019

ISSUED FOR: BID
ISSUED DATE: 02.11.2019

DRAWN BY: JW
CHECKED BY: CM
PROJECT NUMBER: 1418283

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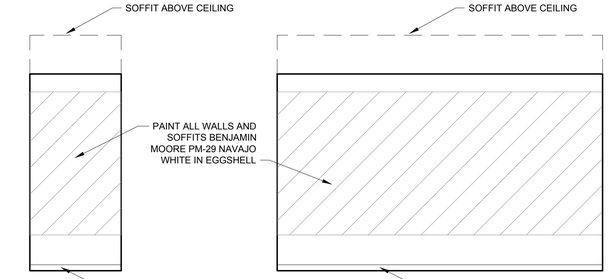
DRAWING NAME
RAMP / STAIR / SOFFIT DETAILS

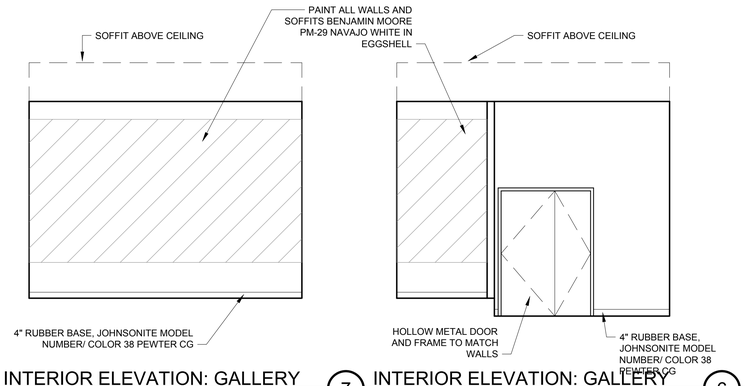
DRAWING NO.
A602

NOTE:
HATCH AREA INDICATES LOCATION OF PLYWOOD, 2'-0" A.F.F. TO 10'-0" A.F.F.



10 INTERIOR ELEVATION: GALLERY
Scale: 1/4" = 1'-0"

9 INTERIOR ELEVATION: GALLERY
Scale: 1/4" = 1'-0"

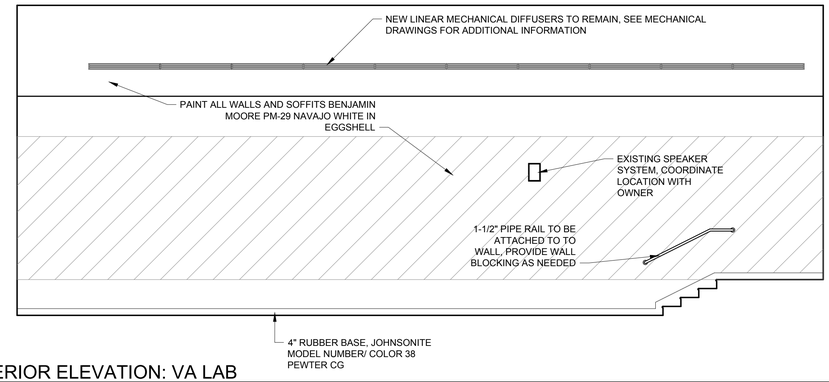


8 INTERIOR ELEVATION: GALLERY
Scale: 1/4" = 1'-0"

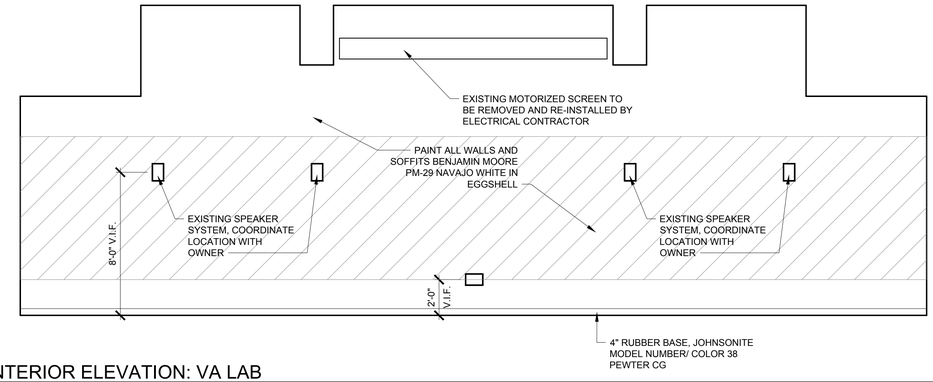
7 INTERIOR ELEVATION: GALLERY
Scale: 1/4" = 1'-0"

6 INTERIOR ELEVATION: GALLERY
Scale: 1/4" = 1'-0"

5 INTERIOR ELEVATION: GALLERY
Scale: 1/4" = 1'-0"



4 INTERIOR ELEVATION: VA LAB
Scale: 1/4" = 1'-0"



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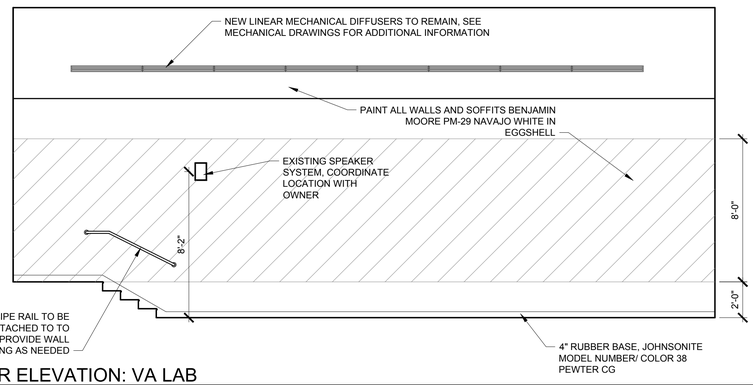
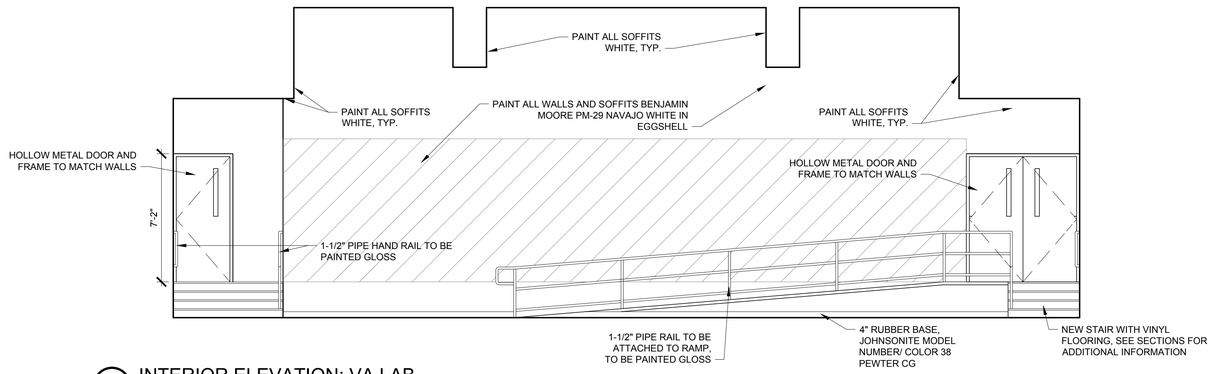
Scale: 1/4" = 1'-0"



2 INTERIOR ELEVATION: VA LAB
Scale: 1/4" = 1'-0"



1 INTERIOR ELEVATION: VA LAB
Scale: 1/4" = 1'-0"

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DRAWING NAME
INTERIOR ELEVATIONS

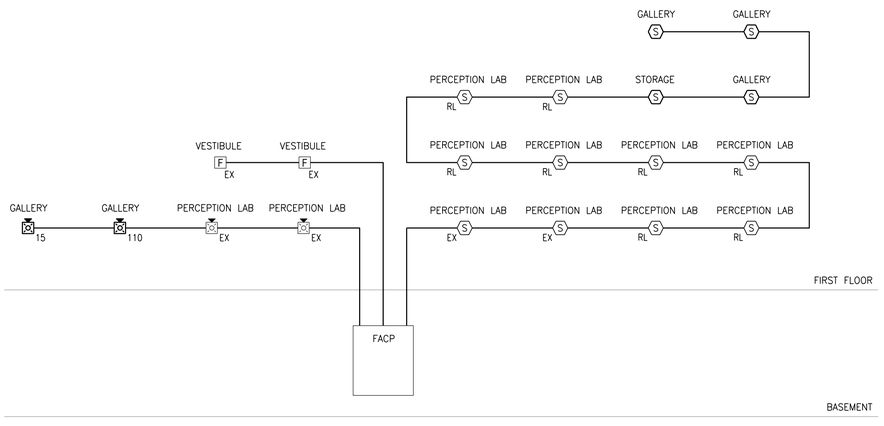
DRAWING NO.
A701

FIRE ALARM GENERAL NOTES

1. ALL WIRING, POWER, CONDUCTORS, CONDUITS ETC. SHALL MEET THE 2014 NYS ELECTRICAL CODE, AND THE 2016 INTERNATIONAL BUILDING CODE, AS MODIFIED BY 2017 NEW YORK STATE CODE SUPPLEMENT.
2. ALL WORK SHALL BE IN ACCORDANCE WITH THE STATE BUILDING CODE AND IN ACCORDANCE WITH 2013 NFPA 72.
3. ALL FIRE ALARM CIRCUITS SHALL BE SIZED TO A MAXIMUM OF 80% OF CAPACITY.
4. ALL FIRE ALARM CIRCUITS SHALL BE WIRED TO MATCH EXISTING WITH THE EXCEPTION OF THE NETWORK CIRCUIT WHICH SHALL BE NFPA STYLE 7 (CLASS A WITH ISOLATION). ALL AUDIBLE AND VISUAL CIRCUITS SHALL MATCH EXISTING.
5. CONDUITS MAY NOT ENTER THE TOP OF ANY FIRE ALARM EQUIPMENT CABINET.
6. ALL FIRE ALARM EQUIPMENT SHALL BE INSTALLED WITH AESTHETICS IN MIND.
7. ALL FIRE ALARM JUNCTION BOXES SHALL BE PAINTED FIRE DEPARTMENT RED.
8. ALL FIRE ALARM WIRE SHALL BE CLEARLY LABELED IN JUNCTION BOXES. ALL TERMINALS SHALL BE NUMBERED AND LABELED. ALL CONNECTIONS SHALL BE EITHER SOLDERED, APPROVED TERMINAL STRIPS OR SCOTCH LOCKS.
9. ALL LOW VOLTAGE FIRE ALARM CONDUCTORS SHALL BE PROTECTED BY EITHER BUILDING CONSTRUCTION OR CONDUIT TO 7 FEET ABOVE THE FINISHED FLOOR. ELECTRICAL ROOMS AND OTHER LOCATIONS SUBJECT TO MECHANICAL DAMAGE SHALL BE IN FULL RIGID CONDUIT.
10. FIRE ALARM CABLES SHALL NOT BE MIXED WITH NON FIRE ALARM CABLING. LOW VOLTAGE FIRE ALARM CABLING SHALL NOT BE MIXED OR WIRED NEAR ANY AC CIRCUIT.
11. ALL NOTIFICATION CIRCUITS SHALL BE A MINIMUM OF 14 AWG AND ALL OTHER LOW VOLTAGE FIRE ALARM CIRCUITS SHALL BE 16 AWG MINIMUM.
12. POLARITY SHALL BE OBSERVED ON ALL CIRCUITS. T-TAPPING SHALL NOT BE ALLOWED ON ANY NOTIFICATION CIRCUITS (HORN, STROBE OR SPEAKER). T-TAPPING SHALL NOT BE PERMITTED ON ADDRESSABLE CIRCUITS WITHOUT THE EXPRESS PERMISSION OF THE ENGINEER.
13. ALL WIRING SHALL BE INSPECTED TO ASSURE THERE ARE NO OPENS, SHORTS OR EARTH GROUNDS.
14. SHIELDED CONDUCTORS OR RUNNING IN SEPARATE RACEWAY SHALL BE AS INSTRUCTED BY THE FIRE ALARM MANUFACTURER'S DOCUMENTATION. ALL NON-POWER LIMITED WIRING, INCLUDING CIRCUITS FOR CENTRALIZED AMPLIFIERS SHALL BE RUN IN A SEPARATE RACEWAY (NOTE: CENTRALIZED AMPLIFIERS "AMP RACKS" ARE NOT PERMITTED ON NEW SYSTEMS).
15. A CENTRAL STATION DIALER AND TWO DEDICATED PHONE LINES SHALL BE PROVIDED.
16. ALL AREA SMOKE DETECTORS SHALL BE PHOTO-ELECTRIC TYPE.
17. SMOKE DETECTORS MUST BE MOUNTED AT LEAST 3 FT AWAY FROM ANY AIR REGISTER.
18. ALL CEILING MOUNT DEVICES MUST BE SECURELY FASTENED TO BUILDING CONSTRUCTION.
19. DEVICE LOCATIONS MUST BE READILY ACCESSIBLE TO ALLOW FOR MAINTENANCE AND REPAIR.
20. DUCT MOUNTED SMOKE DETECTORS SHALL BE MOUNTED ON THE DUCTWORK IN STRICT ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
21. MANUAL STATIONS SHALL BE MOUNTED 48 INCHES ABOVE THE FINISHED FLOOR TO THE HANDLE OF THE STATION AND SHALL BE PAINTED FIRE DEPARTMENT RED. ALL MANUAL STATIONS SHALL BE INSTALLED SO THAT THEY ARE KEPT UN-OBSTRUCTED AT ALL TIMES.
22. ALL STROBE LIGHTS SHALL BE UL-1971 APPROVED/LISTED. THE MINIMUM CANDELA IS 15 UNLESS OTHERWISE NOTED.
23. NOTIFICATION DEVICES THAT INCLUDE A STROBE SHALL BE MOUNTED 80 INCHES OFF THE FINISHED FLOOR TO THE BOTTOM OF THE STROBE, NOT NECESSARILY THE ELECTRICAL BOX.
24. LOCATIONS OF ALL FIRE ALARM EQUIPMENT SHALL BE SUBJECT TO LOCAL AUTHORITY APPROVAL. NO CHANGE OR MODIFICATION TO THE SYSTEM OR PLANS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER OF RECORD. IF ANY CHANGES ARE MADE TO THE DRAWINGS PRIOR TO OR DURING INSTALLATION, AS BUILT PLANS SHALL BE PREPARED BY THE ENGINEER AND FILED WITH THE APPROPRIATE AGENCIES FOR FINAL ACCEPTANCE.
25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ANY AND ALL ABANDONED FIRE ALARM CABINETS, DEVICES, AND WIRE. PAINT, PATCH AND CLEANUP SHALL ALSO BE INCLUDED.
26. CONTRACTOR SHALL WORK ON EXISTING CAMPUS FIRE ALARM SYSTEMS AS OUTLINED IN CAMPUS' "SPECIAL CONDITIONS FOR CONSTRUCTION" REQUIREMENTS.

FIRE ALARM SYMBOLS

F	MANUAL PULL STATION
S	AREA SMOKE DETECTOR, CEILING MOUNTED (SMOKE DETECTOR, SEMI-FLUSH MOUNTED IN CEILING)
	COMBINATION HORN/VISUAL ALARM; WALL MOUNTED
FACP	FIRE ALARM AND CONTROL PANEL
EXR	INDICATES EXISTING TO BE RELOCATED
RL	INDICATES RELOCATED



1 FIRE ALARM RISER DIAGRAM
SCALE: N/A

FIRE ALARM SYSTEM NOTES:

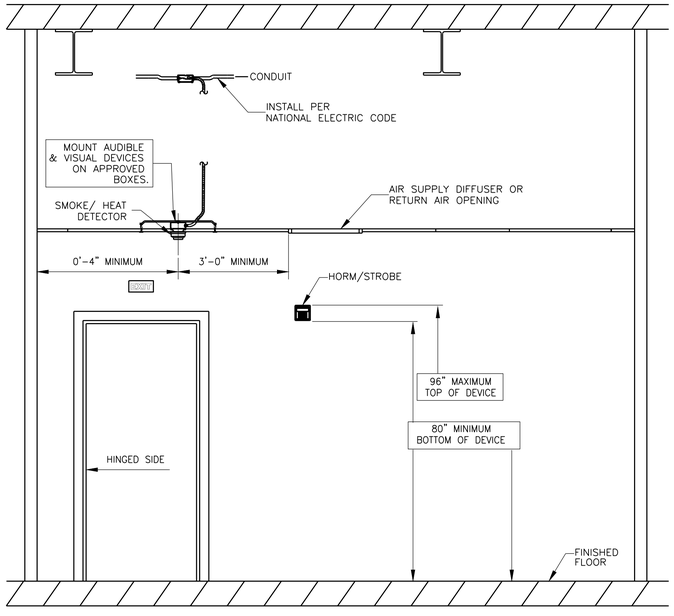
1. COORDINATE EXTENT OF WORK WITH FIRE ALARM VENDOR PRIOR TO COMMENCING WORK. FIRE ALARM VENDOR CONTACT INFO:

NAME: NICK DELFICO
COMPANY: RED HAWK FIRE AND SECURITY
PHONE: (914)-769-8900

2. PROVIDE ALL REQUIRED DEVICES/EQUIPMENT AND WIRING REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.
3. ALL NEW COMPONENTS SHALL BE COMPATIBLE WITH EXISTING FIRE ALARM SYSTEM.
4. INCLUDE ALL FIRE ALARM VENDOR COSTS, INCLUDING RE-PROGRAMMING OF EXISTING FIRE ALARM SYSTEM AND UPDATING GRAPHICS AT HEAD END.
5. TEST SYSTEM TO ENSURE COMPLETE FUNCTIONALITY OF ALL NEW AND EXISTING EQUIPMENT AND DEVICES.
6. CONTRACTOR SHALL COORDINATE LOCATION OF EXISTING FACP LOCATION IN CELLAR FOR CONNECTION TO FIRE ALARM CONTROL SYSTEM.

		CONTROL UNIT ANNUNCIATION				NOTIFICATION				REQUIRED FIRE SAFETY CONTROL			
		ACTUATE COMMON ALARM SIGNAL	ACTUATE AUDIBLE ALARM SIGNAL	ACTUATE COMMON TROUBLE SIGNAL INDICATOR	ACTUATE AUDIBLE COMMON TROUBLE SIGNAL	DISPLAY/PRINT CHANGE OF STATUS	TRANSMIT AUTOMATIC ALARM SIGNAL TO SUPERVISING STATION	TRANSMIT MANUAL SIGNAL TO SUPERVISING STATION	TRANSMIT TROUBLE SIGNAL TO SUPERVISING STATION	RELEASE MAGNETICALLY HELD DOORS	CLOSE SMOKE/FIRE DAMPERS IN RATED WALLS	SHUT DOWN ALL FANS OVER 2000 CFM	CLOSE ASSOCIATED SMOKE DAMPER	
		A	B	C	D	E	F	G	H	I	J	K	L	
1	MANUAL FIRE ALARM BOXES	X	X			X		X		X				1
2	AREA SMOKE DETECTORS	X	X			X	X			X	X	X	X	2
3	OPEN CIRCUIT			X	X	X			X					3
4	GROUND FAULT			X	X	X			X					4
5	NOTIFICATION APPLIANCE CIRCUIT SHORT			X	X	X			X					5
		A	B	C	D	E	F	G	H	I	J	K	L	

2 SEQUENCE OF OPERATION MATRIX
SCALE: N/A



3 DEVICE MOUNTING DETAIL
SCALE: N/A

FIRE ALARM DRAWING LIST

FA-001	FIRE ALARM SYMBOLS LIST, GENERAL NOTES, MATRIX, MOUNTING HEIGHT DETAIL, RISER DIAGRAM AND DRAWING LIST
FAD-101	FIRE ALARM DEMOLITION PLAN
FA-101	FIRE ALARM CONSTRUCTION PLAN
FA-200	FIRE ALARM SPECIFICATIONS

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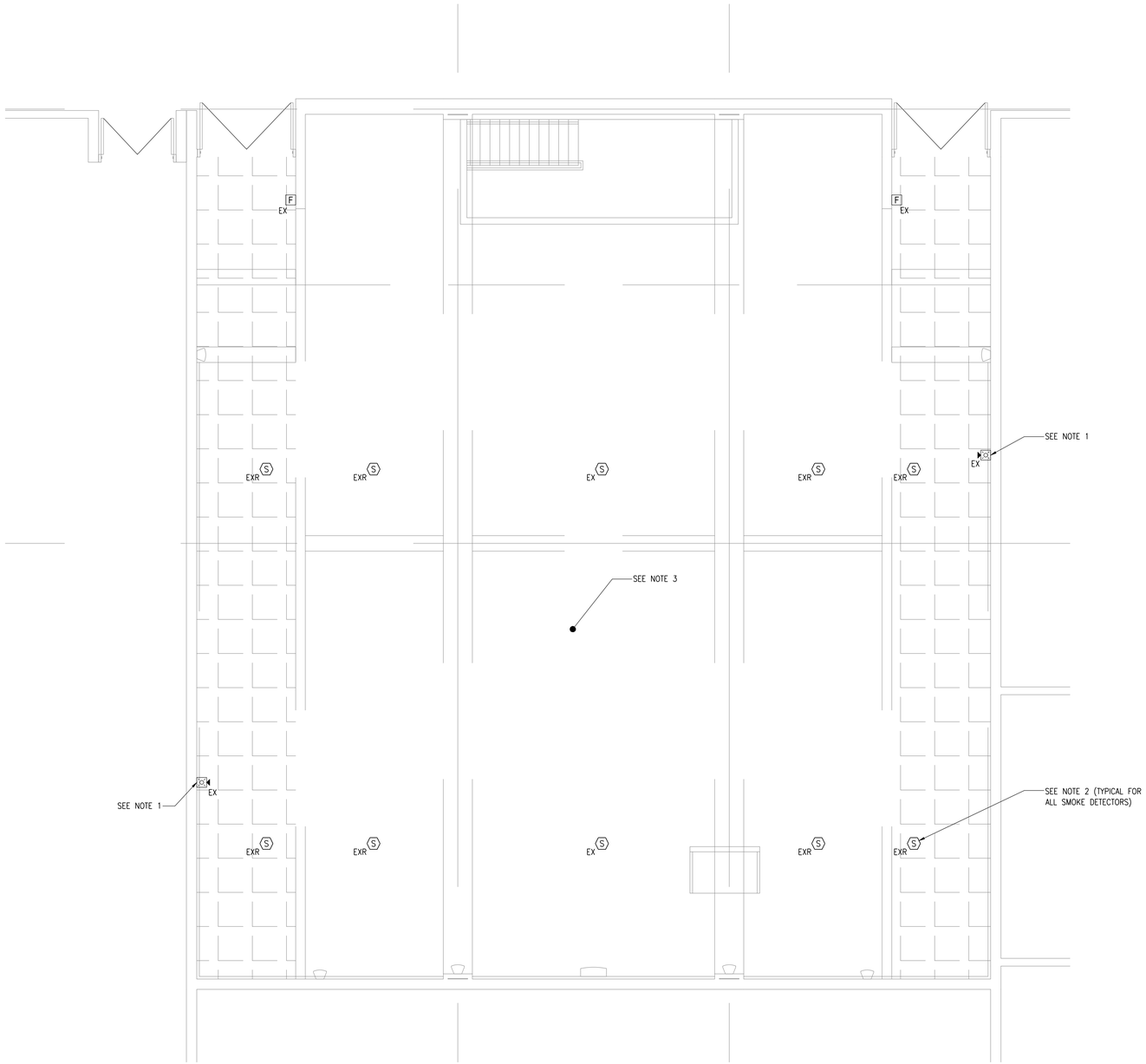
CHECKED BY: DC
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
FIRE ALARM SYMBOLS LIST, GENERAL NOTES, MOUNTING DETAIL, RISER DIAGRAM AND DRAWING LIST

DRAWING NO.
FA-001

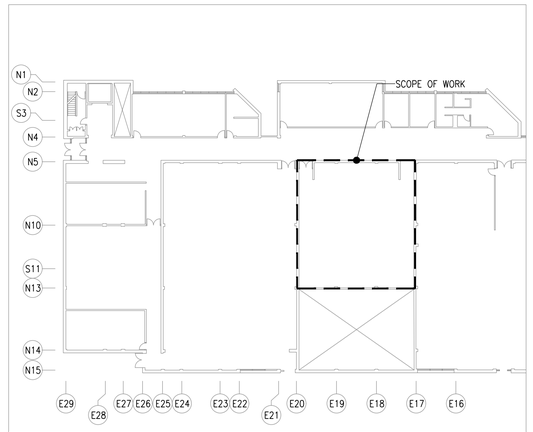


1 FIRE ALARM DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

FIRE ALARM NOTES:

1. EXISTING SPEAKER STROBE TO REMAIN. PROVIDE EXTENSION BOX SO DEVICE RESTS FLUSH WITH NEW SHEETROCK WALL.
2. REMOVE ALL SMOKE DETECTORS DURING CONSTRUCTION TO ACCOMMODATE CEILING WORK. STORE SMOKE DETECTORS FOR RE-INSTALLATION.
3. ALL EXISTING FIRE ALARM CIRCUITS AND CONDUIT ARE SURFACE-MOUNTED AND SHALL BE REMOVED FROM CEILING TO ACCOMMODATE CEILING REMOVAL. CIRCUITS SHALL BE REMOVED TO NEAREST JUNCTION BOX OUTSIDE AREA OF WORK AND SHALL REMAIN FOR CONNECTING NEW DEVICES.



KEY PLAN

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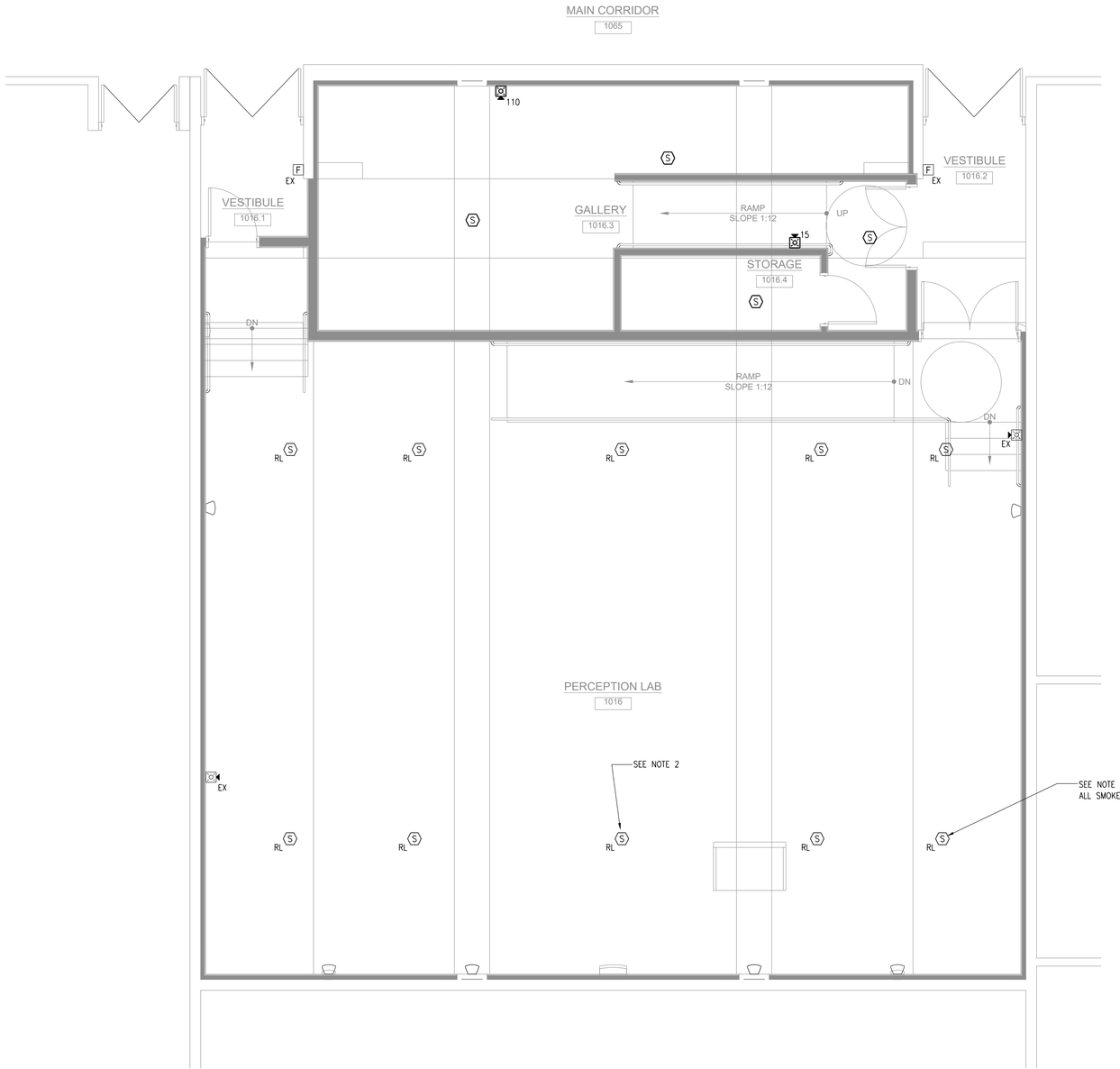
DRAWING NAME

FIRE ALARM
DEMOLITION PLAN

DRAWING NO.

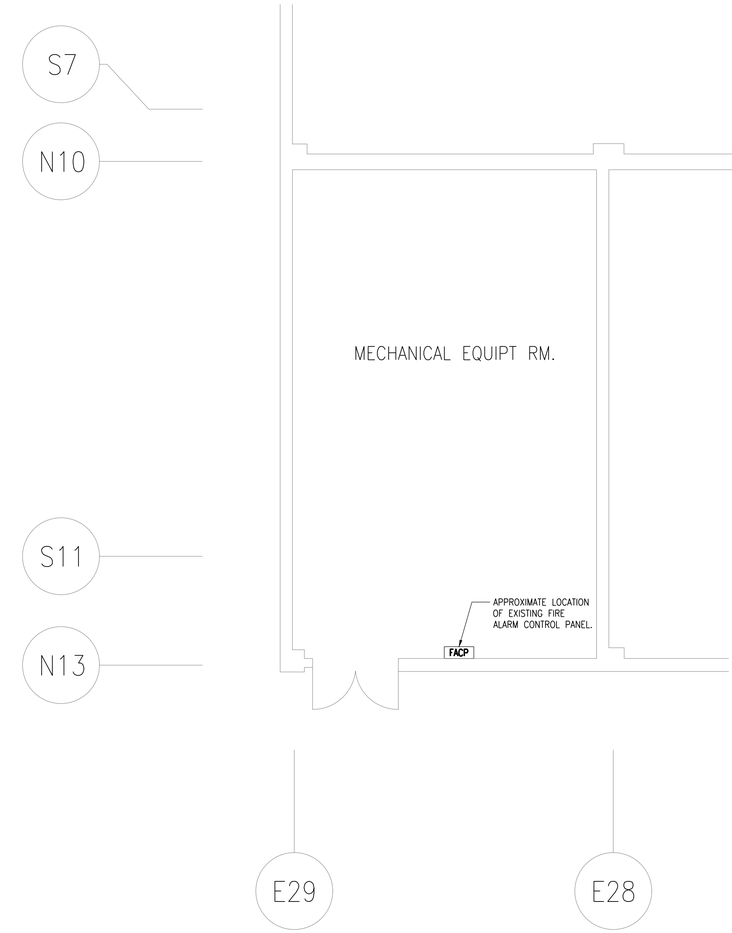
FAD-101



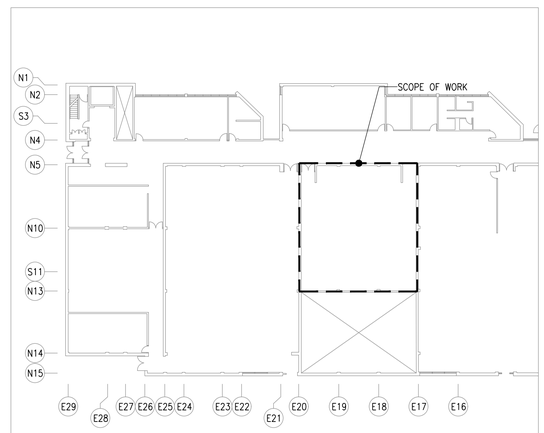
1 FIRE ALARM PLAN
SCALE: 1/4" = 1'-0"

FIRE ALARM NOTES:

1. CONDUITS SHALL BE CONCEALED WITHIN NEW GYPSUM BOARD AND HUNG CEILINGS.
2. FINAL LOCATIONS OF SMOKE DETECTORS TO BE DETERMINED IN THE FIELD, IN COORDINATION WITH OTHER CEILING ELEMENTS.



2 FIRE ALARM BASEMENT PART PLAN
SCALE: 1/4" = 1'-0"



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DRAWING NAME
FIRE ALARM PLAN

DRAWING NO.
FA-101

1. GENERAL:

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR.
C. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
D. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
E. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
F. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
G. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
H. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.
I. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE SCHOOL. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
J. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
K. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
L. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
M. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC) AND CONDITIONS.
N. IT SHALL BE CONTRACTORS RESPONSIBILITY TO PAY FOR ALL COSTS ASSOCIATED WITH UPDATING GRAPHICS ON FIRE ALARM CONTROL PANEL TO REFLECT CHANGES TO THE FIRE ALARM SYSTEM.
O. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

2. SCOPE OF WORK:

A. THE WORK COVERED BY THIS SECTION OF THE SPECIFICATION SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS AND SERVICES TO MAKE MODIFICATIONS TO AN EXISTING FIRE ALARM SYSTEM OF THE ADDRESSABLE, NON-CODED TYPE. THE MODIFICATIONS TO THE EXISTING SYSTEM SHALL CONSIST OF, BUT NOT BE LIMITED TO, THE FOLLOWING:
   1) ADDRESSABLE MANUAL FIRE ALARM STATIONS.
   2) ADDRESSABLE ANALOG AREA SMOKE DETECTORS.
   3) AUDIBLE NOTIFICATION APPLIANCES – HORNS.
   4) VISUAL NOTIFICATION APPLIANCES – STROBES.
B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.
C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
E. THE CONTRACTOR SHALL COORDINATE WORK IN THIS SECTION WITH ALL RELATED TRADES.

3. APPLICABLE CODES AND STANDARDS

A. ALL EQUIPMENT SHALL BE UL LISTED FOR ITS INTENDED USE AND CONFORM TO THE LATEST UL STANDARDS.
B. UNDERWRITERS LABORATORIES INC.: THE SYSTEM AND ALL COMPONENTS SHALL BE LISTED BY UNDERWRITERS LABORATORIES INC. FOR USE IN FIRE PROTECTIVE SIGNALING SYSTEM UNDER THE FOLLOWING STANDARDS AS APPLICABLE:
   UL 864/UOJZ, APOU CONTROL UNITS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
   UL 268 SMOKE DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
   UL 217 SMOKE DETECTORS SINGLE STATION.
   UL 464 AUDIBLE SIGNALING APPLIANCES.
   UL 1638 VISUAL SIGNALING APPLIANCES.
   UL 38 MANUALLY ACTIVATED SIGNALING BOXES.
   UL 1481 POWER SUPPLIES FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
C. THIS INSTALLATION SHALL COMPLY WITH:
   1) AMERICANS WITH DISABILITIES ACT (ADA)
   2) NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS: NFPA72
   3) LOCAL AND STATE BUILDING CODES AND THE LOCAL AUTHORITIES HAVING JURISDICTION.
   4) INTERNATIONAL STANDARDS ORGANIZATION (ISO): ISO-9001
   5) ALL POWER AND WIRE REQUIREMENTS SHALL FOLLOW THE 2011 NYC ELECTRICAL CODE.
   6) NYS BUILDING CODE
   7) UTILIZE MEA/BSA/OTCR APPROVED FIRE ALARM EQUIPMENT.
   8) THE REQUIREMENTS OF THE CITY OF NEW YORK BUILDING DEPARTMENT AND THE CITY OF NEW YORK FIRE DEPARTMENT.

4. SHOP DRAWINGS

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
   1) PROJECT NAME AND LOCATION
   2) NAME OF ARCHITECT AND ENGINEER
   3) ITEM IDENTIFICATION
   4) APPROVAL STAMP OF PRIME CONTRACTOR
C. SUBMISSIONS:
   1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT VIA EMAIL TO ENGINEER AND ARCHITECT.
D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
   1) FIRE ALARM DEVICES
   2) RACEWAYS
   3) WIRE AND CABLE

5. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

6. GENERAL PROVISIONS FOR FIRE ALARM WORK:

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
B. DEFINITIONS:
   1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
   2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
   3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
   4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
   5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.
   6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
   7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
   8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
C. QUALITY ASSURANCE
   1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
   2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
D. PRODUCT DELIVERY, STORAGE AND HANDLING
   1) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
E. MATERIALS
   1) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
   2) INSERTS AND SUPPORTS:
      a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
         – SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
         – MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
         – CLIP FORM NAILS FLUSH WITH INSERTS.
         – MAXIMUM LOADING 75 PERCENT OF RATING.
      b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
      c. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: JUNCTION BOXES, ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

7. CIRCUITING GUIDELINES

A. EACH SIGNALING LINE CIRCUIT (SLC) SHALL BE CIRCUITED SO DEVICE LOADING IS NOT TO EXCEED 80% OF LOOP CAPACITY IN ORDER TO LEAVE FOR SPACE FOR FUTURE DEVICES. THE LOOP WIRING CLASS SHALL MATCH EXISTING.
B. NAC CIRCUITS SHALL MATCH EXISTING. EACH OF THE FOLLOWING TYPES OF ALARM NOTIFICATION APPLIANCES SHALL BE CIRCUITED AS SHOWN ON THE DRAWINGS BUT SHALL BE TYPICALLY AS FOLLOWS:
   1) AUDIBLE SIGNALS: PROVIDE SUFFICIENT SPARE CAPACITY TO ASSURE THAT THE ADDITION OF FIVE (5) AUDIBLE DEVICES CAN BE SUPPORTED WITHOUT THE NEED FOR ADDITION CONTROL COMPONENTS (POWER SUPPLIES, SIGNAL CIRCUIT MODULES, AMPLIFIERS, BATTERIES, ETC.)
   2) VISUAL SIGNALS PROVIDE SUFFICIENT SPARE CAPACITY TO ASSURE THAT THE ADDITION OF THREE (3) VISUAL DEVICES CAN BE SUPPORTED WITHOUT THE NEED FOR ADDITION CONTROL COMPONENTS (POWER SUPPLIES, SIGNAL CIRCUIT MODULES, BATTERIES, ETC.)
G. IN NO CASE SHALL ANY FIRE ALARM CIRCUIT BE SIZED BEYOND 80% OF CIRCUIT CAPACITY.

8. RACEWAYS:

A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.
B. MATERIALS
   1) RACEWAYS:
      a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.
      b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
      c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
   2) FITTINGS AND ACCESSORIES:
      a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.
      b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
      c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
      d. BUSHINGS: METALLIC INSULATED TYPE.
   3) BOXES:
      a. JUNCTION BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE.
C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.
PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB.
SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.
MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.
EMT SHALL BE PERMITTED FOR WIRING, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING. ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.
EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION. RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.
D. ERECT DEVICES IN ADVANCE OF FURRING AND FIREPROOFING. BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY.
E. JUNCTION BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT.
F. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.

10. TESTS

A. THE FIRE ALARM SYSTEM VENDOR SHALL TEST THE SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND NFPA 72. THE VENDOR SHALL PROVIDE COMPLETED REPORTS TO THE CONSULTING ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FINAL ACCEPTANCE.

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PROJECT
SUNY PURCHASE COLLEGE
VISUAL ARTS PERCEPTION LAB RENOVATION
735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

ISSUED FOR: BID & PERMIT
ISSUED DATE: 02.11.2019

DRAWN BY: AR
CHECKED BY: DC
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
FIRE ALARM SPECIFICATIONS

DRAWING NO.
FA-200

GENERAL NOTES

1. GENERAL NOTES, SYMBOL LIST AND DETAILS ARE APPLICABLE TO ALL HVAC/MECHANICAL DRAWINGS.
2. DRAWINGS ARE DIAGRAMMATIC. DETERMINE EXACT LOCATIONS OF SYSTEMS AND COMPONENTS IN FIELD. RELOCATE EXISTING WORK THAT INTERFERES WITH WORK OF THIS CONTRACT.
3. COORDINATE THIS WORK WITH THAT OF OTHER TRADES.
4. DIMENSIONS SHOWN ON PLAN ARE HORIZONTAL. DIMENSIONS SHOWN IN ELEVATION ARE VERTICAL.
5. MANUFACTURERS MODEL NUMBERS ARE SPECIFIED SOLELY TO ESTABLISH STANDARDS OF QUALITY FOR PERFORMANCE AND MATERIALS.
6. PRODUCT INSTALLATION SHALL ADHERE TO MANUFACTURER'S REQUIREMENTS.
7. PROVIDE ACCESS PANELS FOR EQUIPMENT THAT REQUIRES PERIODIC SERVICE.
8. PROVIDE HANGERS, ANCHORS, SUPPLEMENTAL STEEL & SUPPORTS AS REQUIRED TO SUPPORT DUCTWORK, PIPING AND EQUIPMENT FROM STRUCTURE.
9. SCHEDULE WORK OF THIS SECTION TO AVOID INTERFERING WITH EXISTING OPERATIONS IN THE FACILITY.
10. MECHANICAL CONTRACTOR TO NOTIFY OWNER PRIOR TO STARTING WORK TO VERIFY COMPLIANCE WITH BOND AND WARRANTY OF EXISTING ROOF.
11. RUN DUCTS AND PIPING CONCEALED, UNLESS OTHERWISE SPECIFIED AND CLEAR OF CEILING INSERTS.
12. INSTALL THERMOSTATS 4'-6" ABOVE FINISHED FLOOR UNLESS OTHERWISE DIRECTED BY ARCHITECT.

DEMOLITION NOTES

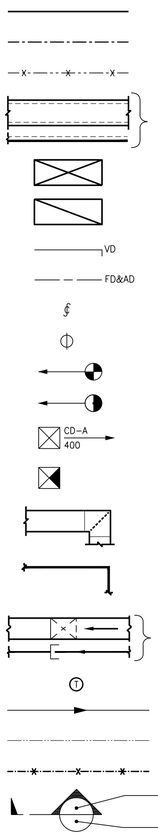
1. THE CONTRACTOR SHALL INCLUDE IN HIS PRICE ALL COSTS ASSOCIATED WITH REMOVALS AND RELOCATIONS OF HVAC WORK AS DESCRIBED ON THE DRAWINGS AND IN THE SPECIFICATIONS WITH ALLOWANCES FOR EXPECTED OR UNFORESEEN DIFFICULTIES WHEN CONCEALED WORK HAS BEEN OPENED. NO CLAIMS FOR ADDITIONAL WORK ASSOCIATED WITH DEMOLITION WILL BE ACCEPTED, EXCEPT IN CERTAIN CASES CONSIDERED JUSTIFIABLE BY THE OWNER/ENGINEER.
2. THE CONTRACTOR SHALL PERFORM DEMOLITION AND REMOVAL WORK WITH MINIMUM INTERFERENCE TO FUNCTIONING HVAC SYSTEMS. ALL AFFECTED SYSTEMS SHALL BE RECONNECTED AND RESTORED.
3. DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER. THE CONTRACTOR SHALL PATCH, REPAIR OR OTHERWISE RESTORE ANY DAMAGED INTERIOR OR EXTERIOR BUILDING SURFACE TO ITS ORIGINAL CONDITION.
4. THE CONTRACTOR SHALL NOTIFY THE OWNER, AT THE APPROPRIATE TIME, OF THE PROJECTED DEMOLITION AND INSTALLATION SCHEDULE SO THAT THE MECHANICAL WORK MAY BE CARRIED OUT IN COORDINATION WITH THE PROJECT REQUIREMENTS.
5. ARRANGE TO WORK CONTINUOUSLY, INCLUDING OVERTIME IF REQUIRED, TO ASSURE THAT SYSTEMS WILL BE SHUT DOWN ONLY DURING THE TIME ACTUALLY REQUIRED TO MAKE THE NECESSARY CONNECTIONS TO THE EXISTING SYSTEMS.
6. THE SHUTDOWN OF EXISTING BUILDING HVAC SERVICES SHALL BE COORDINATED WITH THE OWNER. MAKE ARRANGEMENTS AT LEAST 5 BUSINESS DAYS PRIOR TO A SHUTDOWN.

AIR SYSTEMS

1. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF AIR DEVICES.
2. INTERNAL AIRFLOW DIMENSIONS ARE SHOWN FOR DUCTS. INCREASE DUCT SIZE AS NECESSARY TO MAINTAIN FREE FLOW AREA INDICATED.
3. USE FLAT TRANSVERSE SEAM FOR DUCTWORK WHERE SPACE AVAILABLE DICTATES.
4. DIFFUSER SIZES SHOWN ARE NECK SIZES. REGISTERS AND GRILLE SIZES ARE NOMINAL.
5. PROVIDE VOLUME DAMPERS OR OTHER APPROVED BALANCING DEVICES AT DUCT BRANCHES AND RUN OUTS, AND AT REGISTER GRILLE AND DIFFUSER NECKS IN SUPPLY, RETURN AND EXHAUST DUCTWORK WHETHER SHOWN OR NOT.

HVAC SYMBOLS

(NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT)



SINGLE LINE DUCTWORK OR EQUIPMENT – NEW

SINGLE LINE DUCTWORK OR EQUIPMENT – EXISTING

DUCTWORK OR EQUIPMENT TO BE REMOVED

DUCTWORK WITH ACOUSTICAL LINING

DUCTWORK UNDER POSITIVE PRESSURE (SUPPLY AIR OR FAN DISCHARGE)

DUCT UNDER NEGATIVE PRESSURE (RETURN, EXHAUST, OR OUTSIDE AIR)

VOLUME DAMPER

FIRE DAMPER AND ACCESS DOOR

CUBIC FEET PER MINUTE

DIAMETER

POINT OF CONNECTION

POINT OF DISCONNECTION

TYPE A CEILING DIFFUSER (400 CFM SUPPLY AIR)

RECTANGULAR DIFFUSER WITH BLANKING PLATE

VANED ELBOW (SEE DETAIL)

VANED ELBOW (SEE DETAIL) OR RADIUS ELBOW

VERTICAL DUCT DROP (IN DIRECTION OF AIRFLOW)

THERMOSTAT

NEW PIPE WITH DIRECTION OF FLOW

EXISTING PIPING

PIPING TO REMOVED

SECTION DESIGNATION

SHEET NO. WHERE SECTION IS SHOWN

MECHANICAL DRAWING LIST

M-001	MECHANICAL SYMBOLS LIST, ABBREVIATIONS, GENERAL NOTES AND DRAWING LIST
M-100	MECHANICAL DEMOLITION/EXISTING PLAN
M-101	MECHANICAL CONSTRUCTION PLAN
M-200	MECHANICAL SCHEDULES AND DETAILS
M-300	MECHANICAL SPECIFICATIONS

HVAC ABBREVIATIONS

AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AL	ACOUSTICAL LINING
AP	ACCESS PANEL
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
CLG	CEILING
CR	CEILING REGISTER
DWG	DRAWING
DIAM	DIAMETER
DN	DOWN
(E)	EXISTING TO REMAIN
EL	ELEVATION
(ER)	EXISTING TO BE REMOVED
(ERR)	EXISTING TO BE REMOVED AND RELOCATED
EXIST	EXISTING
°F	DEGREES FAHRENHEIT
FD	FIRE DAMPER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
GAL	GALLON
HR	HOUR
HT	HEIGHT
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
IN	INCH OR INCHES
KW	KILOWATT
L	LENGTH
LD	LINEAR DIFFUSER
LIN FT	LINEAR FEET
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MIN	MINIMUM
NO.	NUMBER
NTS	NOT TO SCALE
OAI	OUTSIDE AIR INTAKE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	PSI ABSOLUTE
PSIG	PSI GAUGE
RA	RETURN AIR
RG	RETURN GRILLE
RHC	REHEAT COIL
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SPEC	SPECIFICATION
TEMP	TEMPERATURE
TRD	TRANSFER DUCT
TYP	TYPICAL
V	VOLTS

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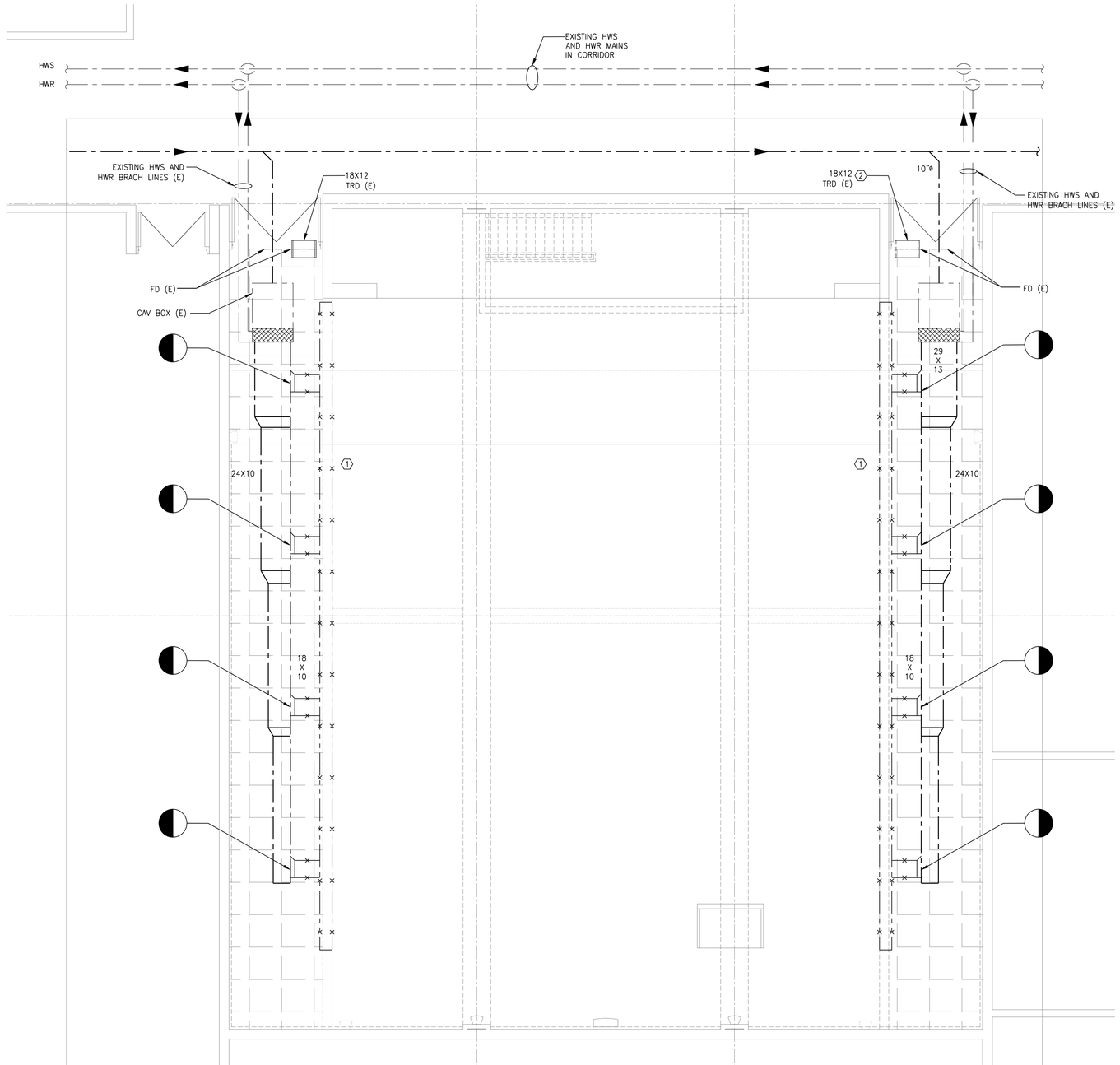
DRAWING NAME

MECHANICAL SYMBOLS LIST, ABBREVIATIONS, GENERAL NOTES AND DRAWING LIST

DRAWING NO.

M-001



1 EXISTING/DEMOLITION PLAN
SCALE: 1/4"=1'-0"

KEY NOTES:

1. EXISTING LINEAR DIFFUSER PLENUM TO BE REMOVED ALONG WITH BRANCH DUCTS, AS INDICATED. BRANCH DUCT OPENINGS ON THE MAIN SUPPLY DUCT TO BE PATCHED AIR TIGHT.
2. EXISTING SLEEVE FOR TRANSFER AIR IS COVERED BY GYPSUM BOARD AT THIS LOCATION. GYPSUM BOARD SHALL BE REMOVED FOR TRANSFER OF AIR.

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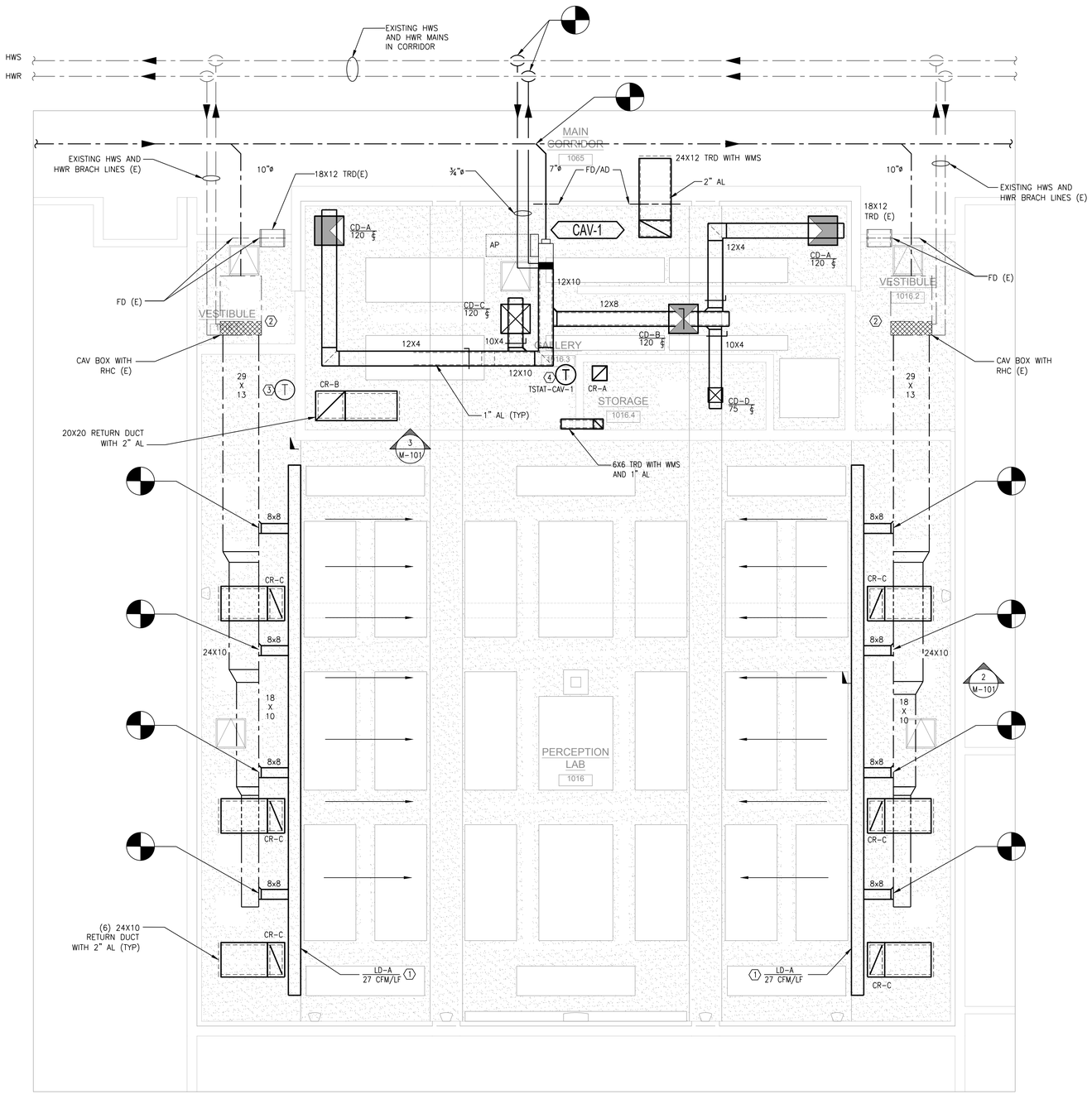
DRAWING NAME
MECHANICAL
DEMOLITION/
EXISTING PLAN

DRAWING NO.
M-100



1 PERCEPTION LAB CONSTRUCTION PLAN
SCALE: 1/4"=1'-0"

GENERAL NOTES:

1. ALL NEW AND EXISTING EQUIPMENT (CAV BOXES), DUCTWORK AND PIPING WITHIN THE NEW GALLERY AND PERCEPTION LAB SPACES SHALL BE SUPPORTED OR RE-HUNG USING A COMBINATION OF 'KINETICS' AF-100 (FOR 20-100 LBS LOADS) AND AF-200 (FOR 50-200 LBS LOADS) HANGERS.
2. THE PERCEPTION LAB AND NEW GALLERY SPACE ARE SERVED BY EXISTING UNIT, AC-4, WHICH IS A CONSTANT AIR VOLUME (CAV) SYSTEM.
3. ALL DEMOLITION AND NEW WORK SHALL BE SCHEDULED IN ADVANCE WITH THE BUILDING MANAGER.

KEY NOTES:

(1) NEW 3-SLOT LINEAR DIFFUSER WITH 27 CFM/FT. TOTAL LENGTH OF LINEAR DIFFUSER IS 35'. CONTRACTOR TO RE-BALANCE THE EXISTING CAV BOXES TO PROVIDE 960 CFM.

(2) PROVIDE A 24"X24" CEILING ACCESS PANEL. COORDINATE FINAL LOCATION DURING CONSTRUCTION.

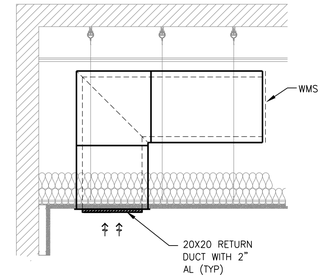
(3) CONTRACTOR SHALL PROVIDE A NEW DDC THERMOSTAT TO REPLACE THE EXISTING PNEUMATIC THERMOSTAT THAT SERVES THE PERCEPTION LAB SPACE. THE NEW THERMOSTAT WILL CONTROL BOTH EXISTING CAV BOXES.

CONTRACTOR SHALL DISCONNECT AND CAP THE EXISTING COMPRESSED AIR PIPING TO THE OLD PNEUMATIC THERMOSTAT.

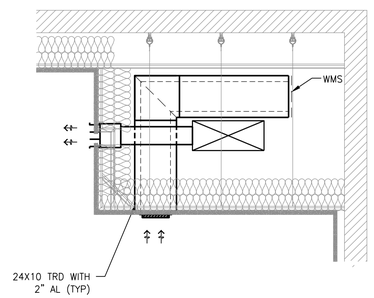
CONTRACTOR SHALL PROVIDE TRANSDUCER AND ANY OTHER REQUIRED CONTROL DEVICES TO ALLOW INTERFACE BETWEEN THE NEW DDC CONTROL AND THE EXISTING CAV BOX CONTROLS. THE FINAL THERMOSTAT LOCATION SHALL BE CONFIRMED DURING CONSTRUCTION.

(4) NEW DDC THERMOSTAT FOR CONTROL OF CAV-1, WHICH WILL SERVE THE NEW GALLERY SPACE.

THE FINAL THERMOSTAT LOCATION SHALL BE CONFIRMED DURING CONSTRUCTION.



3 SECTION AT SOFFIT (GALLERY)
SCALE: 1/2"=1'-0"



2 SECTION AT SOFFIT (PERCEPTION LAB)
SCALE: 1/2"=1'-0"

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

ISSUED FOR: BID & PERMIT
ISSUED DATE: 02.11.2019

DRAWN BY: SD
CHECKED BY: FT
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
MECHANICAL CONSTRUCTION PLAN

DRAWING NO.
M-101

CAV BOX SCHEDULE — DESIGN BASIS: TITUS

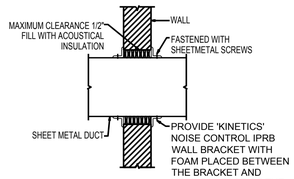
UNIT NO.	INLET SIZE	CFM	MIN. STATIC PRESS. (IN. W.G.)	SOUND LEVEL AT MIN. S.P. (NC)	SOUND LEVEL AT MAX. S.P. (NC)	MODEL NO.	REHEAT COIL						REMARKS
							ROWS	GPM	EWT (°F)	LWT (°F)	PD (FT)	CAPACITY (MBH)	
CAV-1	7"ø	555	0.10	22	–	DESV	1	1.0	180	160	0.64	14	SEE NOTES

NOTES:
1. PROVIDE CAV BOX WITH 1" THICK ENGINEERED POLYMER FOAM INSULATION (FIBRE FREE).
2. PROVIDE CAV BOX WITH FACTORY MOUNTED AND WIRED DDC CONTROLLER TO INTERFACE WITH NEW DDC THERMOSTAT, AND LOW VOLTAGE TRANSFORMER.

DIFFUSER, GRILLE & REGISTER SCHEDULE — DESIGN BASIS: TITUS

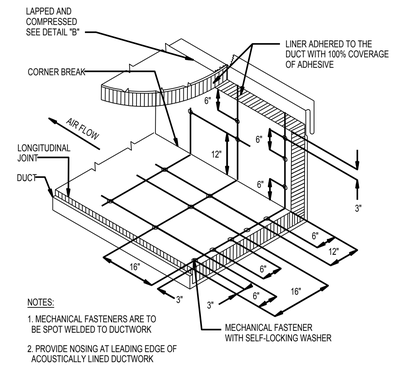
TAG	APPLICATION	MODULE SIZE	NECK SIZE	CFM	MAX P.D.	MAX NC	MATERIAL	MODEL	REMARKS
CD-A	SUPPLY	24X24	12"	120	0.085	12	STEEL	OMNI	SEE NOTES
CD-B	SUPPLY	24X24	8"	120	0.134	21	STEEL	OMNI	SEE NOTES
CG-C	SUPPLY	24X24	6"	120	0.055	12	STEEL	OMNI	SEE NOTES
CG-D	SUPPLY	12X12	4"	75	0.025	–	STEEL	OMNI	SEE NOTES
CR-A	RETURN	12X12	–	0-88	0.008	–	STEEL	350 RL	SEE NOTES
CR-B	RETURN	22X22	–	0-628	0.002	–	STEEL	350 RL	SEE NOTES
CR-C	RETURN	24X10	–	0-475	0.006	–	STEEL	350 RL	SEE NOTES
LD-A	SUPPLY	–	–	960	0.0066	10	STEEL	ML-39	SEE NOTES

NOTES:
1. COORDINATE COLOR AND FINISH WITH ARCHITECT.



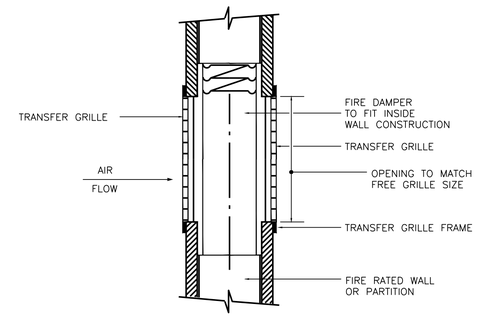
1 DUCT PIERCING RATED OR NON-RATED WALLS

NOT TO SCALE



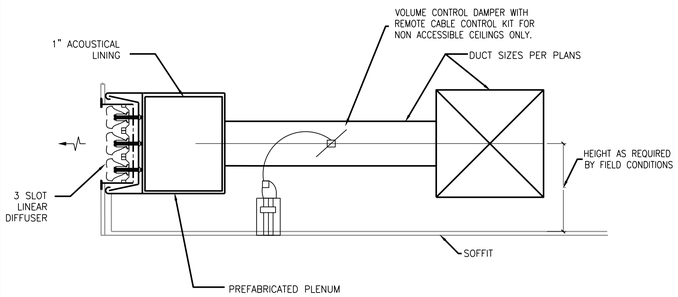
2 ACOUSTICAL DUCT LINING DETAIL

NOT TO SCALE



3 DETAIL OF TRANSFER GRILLE WITH FIRE DAMPER

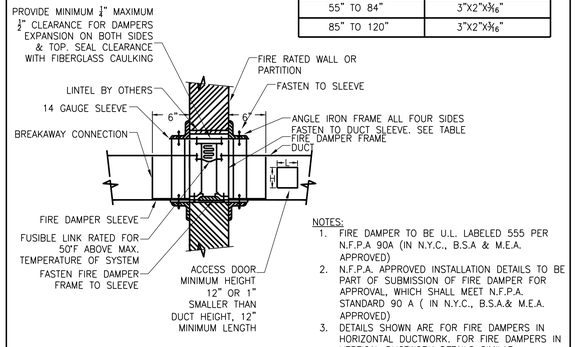
NOT TO SCALE



4 LINEAR SLOT DIFFUSER CONNECTION

NOT TO SCALE

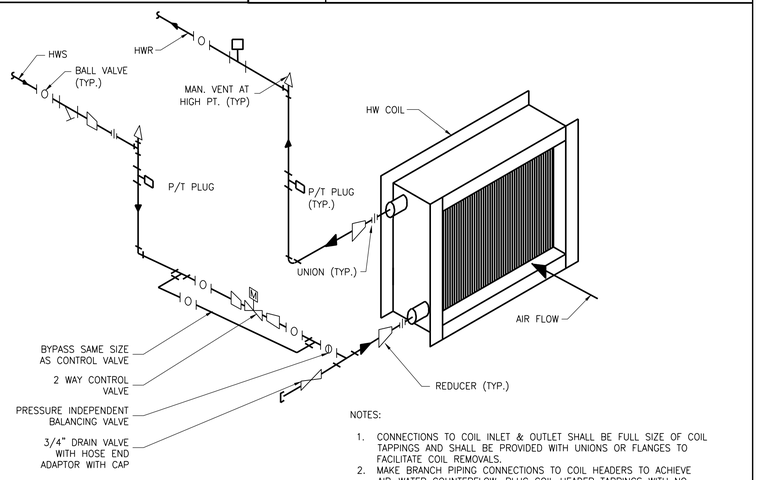
ANGLE IRON TABLE	
WALL OPENING	ANGLE SIZE
UP TO 30"	1"X1"X⅛"
31" TO 54"	1½"X1½"X⅛"
55" TO 84"	3"X2"X3/16"
85" TO 120"	3"X2"X3/16"



NOTES:
1. FIRE DAMPER TO BE U.L. LABELED 555 PER N.F.P.A 90A (IN N.Y.C., B.S.A & M.E.A. APPROVED)
2. N.F.P.A. APPROVED INSTALLATION DETAILS TO BE PART OF SUBMISSION OF FIRE DAMPER FOR APPROVAL, WHICH SHALL MEET N.F.P.A. STANDARD 90 A (IN N.Y.C., B.S.A.& M.E.A. APPROVED)
3. DETAILS SHOWN ARE FOR FIRE DAMPERS IN HORIZONTAL DUCTWORK. FOR FIRE DAMPERS IN VERTICAL DUCTWORK DETAILS SIMILAR.
4. ACCESS DOOR IS SHOWN INSIDE OF DUCT: IF FUSIBLE LINK IS MORE ACCESSIBLE FROM BOTTOM OF DUCT RELOCATE ACCESS DOOR.
5. FIRE DAMPERS SHALL BE SPRING LOADED

5 FIRE DAMPER DETAIL

NOT TO SCALE



NOTES:
1. CONNECTIONS TO COIL INLET & OUTLET SHALL BE FULL SIZE OF COIL TAPPINGS AND SHALL BE PROVIDED WITH UNIONS OR FLANGES TO FACILITATE COIL REMOVALS.
2. MAKE BRANCH PIPING CONNECTIONS TO COIL HEADERS TO ACHIEVE AIR-WATER COUNTERFLOW. PLUG COIL HEADER TAPPINGS WITH NO CONNECTIONS.
3. 3.PROVIDE A MINIMUM OF 3 ELBOW SWING JOINT CONNECTIONS ON PIPING TO COIL.

6 CAV BOX HOT WATER REHEAT COIL PIPING DETAIL

NOT TO SCALE

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

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DRAWN BY: SD
CHECKED BY: FT
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
MECHANICAL SCHEDULES AND DETAILS

DRAWING NO.
M-200

HVAC SPECIFICATIONS

1. General

A. The "General Conditions of the Contract for Construction," AIA document A201, latest edition, and these specifications as applicable are part of this contract.

B. All applicable codes, laws and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the contractor who shall inform the owner, prior to submitting a proposal, of any work or materials which violate any of the above laws and regulations. Any work done by the contractor causing such violation shall be corrected by the contractor.

C. Investigate each space through with equipment must be moved. Where necessary, equipment shall be shipped from manufacturer in sections of size suitable for moving through available restrictive spaces. Ascertain from building owner at what times of day equipment may be moved through all areas.

D. Ductwork and piping is shown diagrammatically and does not show all offsets, drops and rises of runs. The contractor shall allow in his price for routing of ductwork and piping to avoid obstructions. Exact locations are subject to approval of the architect. Coordination with the existing services, including those of other trades is required.

E. Support all ductwork and piping from building structure and/or framing in an approved manner. Where overhead construction does not permit fastening or supports for equipment, furnish additional framing. Inserts shall be steel, slotted type and factory painted. Single rod shall be similar to Grinnell Fig. 281. Multi-rod shall be similar to Fee & Mason Series 9000 with end caps and closure strips. Maximum loading including pipes, ductwork contents and covering shall not exceed 75% of rated insert capability. When supporting from building use beam clamps in approved manner.

F. Install work so as to be readily accessible for operation, maintenance and repair. Minor deviations from drawings may be made to accomplish this, but changes which involve extra cost shall not be made without approval.

G. Removal and relocation of certain existing work will be necessary for the performance of the general work. All existing conditions cannot be completely detailed on the drawings. The contractor shall survey the site and include all changes in making up the work proposal.

H. Plan installation of new work and connections to existing work to insure minimum interference with regular operation of existing facilities. All system shutdowns affecting other areas shall be coordinated with building owner. Install isolation valves at point of connection to the existing piping. Provide temporary duct caps and/or connections to minimize shutdown time.

I. Connect new work to existing work in neat and approved manner. Restore existing work disturbed while installing new work to acceptable condition as determined by architect.

J. Disconnect, remove and/or relocate existing material, equipment and other work as noted or required for proper installation of new system.

K. The contractor shall keep all equipment and materials, and all parts of the building, exterior spaces and adjacent streets, sidewalks and pavements, free from material and debris resulting from the execution of this work. Excess materials will not be permitted to accumulate either on the interior or the exterior.

L. Seal openings around ducts and piping through partitions, walls and floors (not in shafts) with mineral wool or other noncombustible material.

M. All present material, equipment and construction debris to be removed under this contract shall become the property of the contractor with the exception of specific equipment and apparatus requested by the building representative, architect or as noted to be relocated on the drawings shall be properly disposed of by this contractor.

N. Materials and workmanship, unless otherwise noted, shall be in accordance with building standards.

O. The work in the building shall be done when and as directed, and in a manner satisfactory to the owner. The work shall be performed so as to cause the least possible inconvenience and disturbance to the present occupants.

P. The contractor's proposal for all work shall be predicated on the performance of the work during regular working hours. When so directed, however, the contractor shall install work in overtime and the additional cost to be charged therefore shall be only the "premium" portion of the wages paid.

Q. Unless otherwise specifically specified, include all cutting and patching of existing floors, walls, partitions and other materials in the existing building. The contractor shall restore these areas to original condition.

R. Removable access tiles and/or access doors are required in hung ceilings, shafts and walls for all volume and fire dampers, and all other mechanical equipment and devices. HVAC contractor to furnish access location requirements to general contractor. Access tile identification: provide buttons, tabs, and markers to identify location of concealed valves, dampers and equipment.

S. All material and equipment to be new unless otherwise noted and shall be in accordance with building standards.

T. Submission of a proposal shall be construed as evidence that a careful examination of the portions of the existing building, equipment, etc., which affect this work, and the access to such spaces, has been made and that the contractor is familiar with existing conditions and difficulties that will affect the execution of the work. Later claims shall not be made for labor, equipment or materials required because of difficulties encountered which could have been foreseen during such an examination. The on-site inspection shall verify existing ductwork, piping (sizes, clearances, etc) and conditions.

U. Insurance: In accordance with building requirements and shall include a hold harmless clause for owner and engineer.

V. The final acceptance will be made after the contractor has adjusted his equipment, balanced the various systems, demonstrated that it fulfills the requirements of the drawings and specifications and has furnished all the required certificates of inspection and approval.

W. Specifications are of simplified form and include incomplete sentences. Words or phrases such as "the contractor shall," "shall be," "furnish," "provide," "a," "the," and "all" have been omitted for brevity.

X. Definitions:

1) "Provide": To supply, install and connect up complete and ready for safe and regular operation the particular work referred to unless specifically otherwise noted.

2) "Install": To erect, mount and connect complete with related accessories.

3) "Furnish" or "Supply": To purchase, procure, acquire and deliver complete with related accessories.

4) "Work": Labor, materials, equipment, apparatus, controls, accessories and other items required for proper and complete installation.

5) "Concealed": Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces, or in enclosures.

6) "Exposed": Not installed underground or "Concealed" as defined above.

7) "Similar" or "Equal": Equal in materials, weight, size, design and efficiency of specified product.

2. Scope of work

A. The work under contract includes all labor, materials and appliances necessary for the furnishing, installing and testing, complete and ready for safe operation of the systems. Work shall be installed in a neat, workmanlike manner.

B. The contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefore. The contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The contractor shall pay all costs for, and furnish to the owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

C. The contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date or actual use of equipment or occupancy of spaces, by owner, included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the owner. This guarantee shall also provide that where defects occur, the contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the contractor.

D. Special inspection by a licensed professional engineer to be hired by the owner.

E. Prior to the installation of any work and procurement of equipment provide complete set of coordinated shop drawings of all new and existing equipment, ductwork, piping and control systems indicating capacity dimensions and sequence of operation for written approval by the architect and engineer.

3. Shop drawings

A. Indicate on each submission: project name and location, architect and engineer, item identification and approval stamp of prime contractor.

B. Submissions:

1) Submissions 11 in. X 17 in. or smaller: Provide in electronic PDF format to the engineer with a copy to the architect. All submittals shall be complete, otherwise they will be returned to the contractor as "not reviewed".

2) Submissions larger than 11 in. X 17 in.: Provide in electronic PDF format to the engineer with a copy to the architect. All submittals shall be complete, otherwise they will be returned to the contractor as "not reviewed".

C. Submit shop drawings for the following:

1) Sheet metal shop standards.
2) Duct layout.
3) Piping layout.
4) Duct and pipe insulation.
5) Ceiling diffusers and return grilles.
6) Air and water testing and balancing report.
7) Constant air volume (CAV) terminals.Vibration isolation.
8) Automatic control systems and devices.

4. As-built drawings and equipment operation instructions

A. On completion and acceptance of work, this contractor shall furnish written instructions, equipment manuals and demonstrate to the owner the proper operation and maintenance of all equipment and apparatus furnished under this contract.

B. These instructions shall be typed on 8-1/2 in. X 11 in. paper and bound in three-ring binders with clear acetate covers. The contractor shall give three copies of the instructions to the owner and one copy to the engineer.

C. The instruction booklet shall be organized in sections, with one section per system. The cover of the instruction booklet shall bear the name, address and phone number of the project, architect, engineer, mechanical contractor and subcontractors.

D. As-built drawings in PDF format indicating as-installed conditions shall be provided to the architect after completion of the installation.

5. Sheet metal work

A. Except as otherwise shown or noted, all ductwork and other sheet metal work shall be galvanized sheet steel and shall be installed in accordance with the latest edition of Sheet Metal and Air Conditioning Contractors National Association, Inc. duct construction standards, pressure classification 2 in. W.G.

B. Volume dampers: Galvanized steel, per SMACNA "Low Velocity Manual," except provide bearing at one end of damper rod and quadrant, with lever and lock screw at other end. For insulated ducts, quadrants mounted on collar to clear insulation. Install with levers accessible.

C. Access doors: Insulated or uninsulated, same as duct.

1) Provide minimum 24" x 24" on main ducts, and 12" x 12" on branch ducts, unless otherwise approved, at fire dampers and at all duct accessories requiring access.

2) All access doors to be hinged, with latch similar to Ventlock No. 100.

D. Flexible connections: Neoprene-coated glass fabric, 30 oz per square yard with sewed and cemented seams, similar to Vent Fabrics. Provide with metal collars. Allow minimum movement of 1 in.

E. Turning vanes: Galvanized steel small double-thickness vanes with 2 in. inside radius.

F. Fire dampers: UL listed, galvanized steel construction, multi-bladed type, spring loaded, equipped with fusible link, conforming to NFPA standard 90A. Similar to air balance Model 319-P, rated as required. See installation on drawing.

G. All duct dimensions indicated on plans are inside clear dimensions.

H. Wire mesh screen (WMS): No. 16 USSG, 3/4 square mesh, in 1 in. wide galvanized steel enclosing frame. Flanged duct opening to receive frame.

I. Low pressure flexible duct: Shall be a factory fabricated high temperature copolymer impregnated glass fabric, locked to cold rolled flat steel spiral. Similar to Wiremold 57. Maximum installed length shall not exceed 18 in.

6. Air outlets

A. General:

1) Margin types, colors, finish and methods of attachment for all diffusers, grilles and registers shall be coordinated with architectural ceiling and wall details and specifications.

2) Frame type suitable for mounting in ceiling construction as indicated on architectural plans.

3) Exact location of all air outlets as per architectural plans.

4) Suitable for operation at 20% excess and 20% less than noted capacity for constant volume systems and at 20% excess and 60% less than noted capacity for variable volume systems. Manufacturer responsible for examining application of each outlet and guarantee that each will provide required NC levels and comfort space conditions without drafts throughout operating range.

5) All registers and diffusers shall be provided with opposed blade volume dampers. Damper operating levers shall be accessible at the face of air outlets.

B. Linear diffusers: Extruded aluminum construction, natural anodize finish, removable core, air deflection vane and cable operated damper in each branch tap with minimum 3 feet of cable to diffuser face. Similar to Titus Model ML-39.

C. Square diffusers: Diffusers shall be steel construction painted white similar to Titus Omni Plaque diffusers suitable for the type of ceiling.

D. Registers and grilles:

1) Return and exhaust registers: steel construction with volume damper. Similar to Titus 350RL.

7. Noise control

A. All room NC levels shall be 35 or less.

B. Provide sound lining for the following ductwork:

1) Air transfer ducts.

2) Downstream of all constant volume boxes for a minimum of 15 ft.

3) Acoustical return boots.

4) Also where noted on a drawing.

C. Sound-lining in ductwork: Fibrous glass, minimum 3 lb density, 1 in. thickness, maximum 0.25 K factor at 75°F mean temperature with acrylic coated finish factory applied edge coating and stenciled in accordance with NFPA 90. Flame spread shall be a maximum of 25. Lining shall not support microbial growth and shall be tested in accordance with ASTM C 1071 and ASTM G21/G22. Similar to Manville Permacote Lina Coustic.

D. All sound lining, adhesives, faces and accessories to be applied in accordance with manufacturer's recommendations, except as otherwise noted.

8. Testing and balancing

A. The testing and balancing scope of work shall include air and water balancing for the new constant air volume (CAV) box with hot water reheat coil serving the new Gallery space. In addition, re-balance the existing two (2) CAV boxes for the new air flow and hot water requirements.

B. Air balancing shall be accomplished by adjustment of fans, constant volume boxes, and branch dampers for major adjustments. Adjustment of terminal dampers and devices shall be for trim or minor adjustment only. This shall be done to permit the least noise generation in the terminal areas and utilize minimum fan energy.

C. Water balancing shall be accomplished by adjustment of balancing valves at pumps for proper flow. Adjust flow through coils as required.

D. Upon completion of the installation, the contractor shall rebalance any existing portions of air distribution system and water distribution systems affected by the renovation, and also balance all the new work.

E. The contractor shall provide all labor, pressure gauges, flow meters, sheaves, and belts required to balance systems.

F. Balancing report shall be provided on AABC-type forms.

G. Air handling units, pumps, constant volume boxes, and coils shall be balanced to within +5% of their design capacities. All other air and water quantities shall be balanced to within +10% of the design quantities.

H. Balancing and testing shall be performed and supervised by one of the following independent firms specializing in testing and balancing:

1) Precision Testing and Balancing, Inc.

2) Air Conditioning Test and Balancing Corp.

3) Approved equal.

I. The performance and capacity of all systems and equipment to be demonstrated by the contractor.

9. Insulation - general requirements

A. All insulation materials, including jackets, facing, adhesive, coatings, and accessories are to be fire hazard rated and listed by Underwriters Laboratories, Inc. using Steiner Tunnel test method for fire hazard classification of building materials, standard UL 723 (ASTM E-84), (ASA A2.5-1963). Flame spread: Maximum 25. Fuel contributed and smoke developed: Maximum 50. Flame proofing treatments subject to deterioration from moisture or humidity are not acceptable.

B. Definitions:

1) Exposed: Indoor ducts, piping or equipment located in mechanical equipment rooms and in areas which will be visible without removing ceilings or opening access panels.

2) Concealed: Indoor ducts, piping or equipment which is not exposed.

3) Outdoor: Ducts, piping or equipment which is exposed to the weather.

10. Ductwork insulation

A. Insulate all ductwork in accordance with the 2015 International Energy Conservation Code, consisting of a minimum of R-6 insulation where located in unconditioned spaces. If necessary, the insulation thicknesses indicated below shall be adjusted to satisfy this required.

Insulation Schedule - Ductwork

Service	Location	Thickness	Material	Finish
Supply/return	Concealed	1"	D-1	Vaporseal
Supply/return	Exposed	1"	D-2	Vaporseal

B. Reinsulate all ductwork and piping which is existing and damaged during construction or shown or required to be relocated. Insulate with same material and thickness.

C. Non-insulated ductwork:

1) Where sound lining is of minimum thickness specified for insulation.

2) Air conditioning return air ductwork exposed in air conditioned spaces and installed in hung ceilings where space immediately above and below are both air conditioned.

D. Material:

1) Type D-1: Minimum 1-lb density fiberglass blanket, maximum 0.28 K-factor at 75 deg F mean temperature with factory-applied Foil-Skrim-Kraft facing similar to Manville Microlite.

2) Type D-2: 3 lb. Fiberglass board. The maximum K factor shall be 0.23 at 75 deg F mean temperature with a minimum density of 3 lb. The insulation shall be provided with a factory-applied all purpose or all service facing. The insulation shall be equal to Manville Type 814 Spin-Glass AP.

E. Installation:

1) Fiberglass Blanket: 2 in. lap strips at all seams. Secure bottom of all ducts over 24 in. wide with min. 2 rows of weld pins 12 in. on center. Secure all seams with foil vapor barrier tape and vapor seal adhesive.

2) Fiberglass Board: Seal joints and breaks in facing with 3 in. wide tape to match facing and adhere with vapor seal adhesive. Apply 5 in. wide tape at corners, weld pins on top, sides and bottom.

11. Piping insulation

A. Insulate all piping in accordance with insulation schedule except as otherwise noted.

Insulation Schedule - Piping

Service	Size	Thickness	Material	Finish
Hot 100 to 250°F	Up to 2"	1-1/2"	P-1	--
Fittings & valves hot 100 to 250°F	Up to 2"	1-1/2"	P-4	F-1

B. Piping, valves and fittings to be insulated:

1) Low temperature piping systems - 40 to 100°F including:

a. Hot water supply and return.

2) Low temperature hot piping systems - 100 to 250°F including:

a. Low temperature hot water supply and return.

C. Material:

1) Type P-1: Minimum 4 lb density molded fiberglass, maximum 0.23 K-factor at 75°F mean temperature with factory-applied fire-retardant foil skrim kraft facing. All service jacket. Similar to Owens-Corning 650 ASJ.

2) Type P-4: Minimum 1 lb density fiberglass fitting inserts, maximum 0.28 K-factor at 75°F mean temperature similar to Manville hi-lo temp insulation inserts.

D. Finish:

1) Type F-1: Fitting cover, molded white PVC jacket, UL class 1, and maximum permeance of 0.05 similar to Manville Zestron.

E. Installation:

1) Before applying insulation all pressure and leak tests shall be completed and approved.

2) All insulation shall be butted firmly together. Provide 2 in. lamp strips at all seams secured with adhesive. Use vapor barrier tape and vapor seal adhesive where required. Staples not permitted. Refrigerant piping insulation shall have mitered fittings.

3) All insulation and vapor barriers shall be continuous passing through sleeves, hangers, etc., Or other openings. Provide saddles or shields for protection.

4) Insulation for strainers or other fittings or accessories requiring servicing or inspection shall have insulation removable and replaceable without damage.

12. Vibration isolation

A. General:

1) Provide isolation for piping and ductwork.

2) Install in accordance with manufacturer's instructions.

3) Provide leveling devices and approved resilient restraining devices as required to limit equipment and piping motion in excess of 1/4 in.

4) Acceptable manufacturers:

a. Mason Industries, Inc.

b. Vibration Eliminator Co.

c. Kortlund Dynamics Corp.

B. Ceiling equipment:

1) Provide spring hanger rod isolators. Steel compression spring and neoprene sound pad within a steel retainer box. Similar to Mason Type PCHS.

2) 1 in. minimum static deflection. 1/2 in. minimum reserve deflection. Factory-preloaded to 75% of rated load.

3) Provide supplemental steel as required where equipment or structure cannot support point loads.

13. Piping - General Requirements

A. Complete with: Pipe, fittings, valves, strainers, motorized valve operators, strainers, hangers, supports, guide, sleeves, and accessories.

B. All items shall be furnished and installed in accordance with the latest editions of the following codes and standards:

1) American Society of Mechanical Engineers (ASME).

2) American Society for Testing and Materials (ASTM).

3) American National Standards Institute (ANSI).

4) Manufacturers Standardization Society of the Valve and Fitting Industry (MSS).

C. All pressurized piping to be tested hydrostatically to 150 psi or 150% of operating pressure, whichever is greater, but never exceed test pressure ANSI B16.1 basis. Test duration to be 2 hours with no pressure change corrected for temperature change. Repair or replace leaks or defects without additional cost.

D. Provide dielectric fittings where dissimilar metals are to be joined.

E. Pipe supports:

1) Provide adequate support for pipe and contents to prevent sagging, vibration, or swaying and allow for expansion and contraction. Provide supplemental steel as required where structure cannot support point loads.

2) Horizontal piping to be supported by forged steel adjustable clevis type hanger. Maximum spacing as follows:

a. Steel 1 in. and smaller: 7 ft.

b. Steel 1-1/4 in. and larger: 10 ft.

c. Copper 3 in. and smaller: 7 ft.

d. Additional supports at changes in direction, runouts, and concentrated loads due to valves, etc.

14. Low temperature water systems, below 100 psig, -20 to 200°F operating temperatures.

A. Pipe: steel in accordance with ASTM A53 or A120, with schedule 40 wall thicknesses to 10 in.

1) Runouts to equipment and coils: Copper, Type I, hard drawn in accordance with ASTM B88.

B. Fittings:

1) 2 in. and smaller: 125 lb WSP cast iron threaded fittings shall be in accordance with ANSI B16.4., Cast iron flanged fittings shall be in accordance with ANSI B16.1.

2) Copper: Wrought copper, soldered, 95/5TA, ANSI B16.22.

C. Valves:

1) Ball valves:

a. 2 in. and smaller: Bronze one piece body, chrome plated brass ball, Teflon seats and stuffing box ring, lever handle with balancing stops, and solder ends with union. Provide full port valves.

b. Manufacturer: Apollo 70 Series, or approved equal.

2) Balancing Valves:

a. Bell & Gossett Circuit Sentry Flo-setter, or approved equal.

3) Globe valves:

a. 2 in. and smaller: Bronze, regrind-renew, 500 Brinell stainless steel plug disc and 425 Brinell seat ring, union bonnet. 150 lb WSP Jenkins Fig. 546P.

4) Silent check valves, spring loaded, globe type, flanged: To 250 psig check valves shall be iron body, bronze trim. Similar to Muessco Type 103AP or 107-AP.

5) Lubricated plug valves:

a. Screwed ends up to 2 in., Flanged 2-1/2 in. and larger.

b. System less than 100 psig, valve shall be minimum 200 lb WOG Class cast iron body. Rockwell-Nordstrom numbers 114, 115, 185 and 149.

6) Y-type strainers:

a. Provide screwed ends to 2 in. and flanged 2-1/2 in. and large with body as follows: To 100 psig: 125 lb WSP Class, cast iron.

b. Screens to be 316 stainless steel.

c. Provide screwed with faced cap, straight thread and gasket, similar to Mueller steam specialty Muessco No. 11. Provide flanged with bolted cover similar to Muellar steam specialty Muessco No. 751 or No. 752.

D. Provide 1/2 in. drain valve with capped hose connection at all low points. Provide 3/4 in. gate valve to drain systems in equipment rooms.

E. Provide manual air vents line size air chamber with 1/2 in. globe valve at all high points and where direction changes from horizontal to downward flow.

F. Pitch water piping except as noted:

1) Up to 1 in.: 1 in. in 40 ft.

2) 1-1/2 in. and larger: 1 in. in 100 ft.

15. Equipment

A. Constant Air Volume Boxes with Hot Water Coil:

1) Provide constant air volume boxes internally-lined with fiber-free insulation, and as described on the drawings.
2) Provide constant air volume box with a one row hot water coil, as described on the drawings.
3) Provide with direct digital controller.
4) Constant volume box shall be equal to Titus DESV.

16. Automatic controls - General requirements

A. Furnish and install a complete digital control system (DDC) to provide temperature control as specified under description of operation.

B. Work shall include all wiring, control equipment, and accessories necessary to make this system complete. All wiring shall be 24 volt. Coordinate with manufacturer for interconnection with controls included in equipment. All control work shall be installed by HVAC contractor.

C. Controls contractor shall furnish and install the following:

1) DDC thermostat for the new constant air volume (CAV) box with hot water heating coil serving the new gallery space. Contractor shall provide a DDC controller to the CAV box manufacturer for wiring prior to shipment of the complete assembly to the field.
2) Replace the existing thermostat with new wiring for each of the two existing constant air volume boxes serving the Perception Lab.

D. Acceptable manufacturers:

1) Siemens.

E. Sequence of Operation: New Gallery Space

1) Constant air volume (CAV) terminal with hot water reheat coil and DDC controller:

a. The CAV box shall maintain constant air flow to the balanced quantity despite pressure fluctuations in the supply ductwork.
b. The DDC thermostat shall modulate the hot water valve to maintain space set point temperature.

END OF SECTION

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

ISSUED FOR: BID & PERMIT
ISSUED DATE: 02.11.2019

DRAWN BY: SD
CHECKED BY: FT
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
MECHANICAL SPECIFICATIONS

DRAWING NO.
M-300

SYMBOLS LIST

Φ_C	DUPLEX RECEPTACLE RATED AT 20-AMPS 120 VOLTS. C= ABOVE CEILING
	WALL DOUBLE DUPLEX EACH RECEPTACLE RATED AT 20 AMPS, 120 VOLTS. N ONE 4"X4" BOX
Φ^A	SPECIAL PURPOSE RECEPTACLE FLUSH FLOOR MOUNTED LETTER INDICATES TYPE 'A' 208 VOLTS 30 AMPS 2 POLE 3 WIRE (NEMA 6-30R)
∇^2	DATA OUTLET BOX. PROVIDE CAT6 CABLE FROM 2ND FLOOR DATA CLOSET TO DATA OUTLET. REFER TO DWG E-003 FOR LOCATION OF CLOSET. '2' INDICATES QUANTITY OF DATA PORTS 'CM' INDICATED CEILING-MOUNTED
	COMBINATION VOICE/DATA OUTLET BOX. PROVIDE CAT6 CABLE FROM 2ND FLOOR DATA CLOSET TO VOICE/DATA OUTLET. REFER TO DWG E-003 FOR LOCATION OF CLOSET.
J	CEILING MOUNTED JUNCTION BOX (J-BOX) WITH HOMERUN CIRCUIT AND FLEXIBLE CONNECTION TO EQUIPMENT. USE SEALTITE FOR OUTDOOR CONNECTIONS.
J	WALL MOUNTED JUNCTION BOX (J-BOX) WITH HOMERUN CIRCUIT AND FLEXIBLE CONNECTION TO EQUIPMENT. USE SEALTITE FOR OUTDOOR CONNECTIONS.
VAV	VAV DAMPER WITH 120V, 20AMP, SINGLE POLE TOGGLE
RM	INDICATES EXISTING TO BE REMOVED
$\$^{4P}_{D}$	WALL-MOUNTED SWITCH FOR USE WITH POWERPACKS AND MOTION SENSORS. REFER TO DETAIL 2/DWG E-102 FOR MORE INFORMATION. '4P' INDICATES FOUR-POLE '2P' INDICATES TWO-POLE 'D' INDICATES DIMMING MANUFACTURER: ACUITY CONTROLS '4P' MODEL: nPODM 4P DX WH '2P' MODEL: nPODM 2P DX WH LOWERCASE LETTER REFERS TO FIXTURES CONTROLLED.
VS	WALL-MOUNTED VACANCY SENSOR/SWITCH. REFER TO DETAIL 2/DWG E-102 FOR MORE INFORMATION. MANUFACTURER: ACUITY CONTROLS MODEL: WSX SA WH
EM PP VS	VACANCY-POWERPACK WITH 0-10V DIMMING RECESSED IN CEILING. REFER TO DETAIL 2/DWG E-102 FOR MORE INFORMATION. MANUFACTURER: ACUITY CONTROLS MODEL: nPP16 D SA 'EM' INDICATES EMERGENCY POWERPACK 'EM' MODEL: nPP16 D ER SA LOWERCASE LETTER REFERS TO LIGHT FIXTURES CONTROLLED.
MS	CEILING-MOUNTED MOTION SENSOR. REFER TO DETAIL 2/DWG E-102 FOR MORE INFORMATION. MANUFACTURER: ACUITY CONTROLS MODEL: nCM PDT 9 RJB LOWERCASE LETTER REFERS TO LIGHT FIXTURES CONTROLLED.
MS	CORNER-MOUNTED MOTION SENSOR MOUNTED AT 10'-0" A.F.F. REFER TO DETAIL 2/DWG E-102 FOR MORE INFORMATION. MANUFACTURER: ACUITY CONTROLS MODEL: nWV PDT 16 LOWERCASE LETTER REFERS TO LIGHT FIXTURES CONTROLLED.
	CONCEALED CONDUIT
	PULL BOX
	FUSED DISCONNECT SWITCH. FUSE TO BE EQUAL TO OR LESS THAN THE WIRING AMPACITY.
	UNFUSED DISCONNECT SWITCH; SWITCH SIZE TO BE GREATER THAN OR EQUAL TO OVER CURRENT PROTECTION. U.O.N.
M	MOTOR
HOMERUN NOTATION	PP-KIT/21,23,25 PANEL DESIGNATION CKT NUMBER
	WALL-MOUNTED SPEAKER. PROVIDE EMPTY 3/4"C FROM BACK BOX TO JUNCTION BOX BEHIND PODIUM 'PA' INDICATES FOR PODIUM PA SYSTEM
WAP	CEILING-MOUNTED WIRELESS ACCESS POINT.
AL	ASSISTED LISTENING DEVICE LOCATION. PROVIDE EMPTY 1"C TO FROM BACK BOX TO JUNCTION BOX BEHIND PODIUM.
A/V	8" FLUSH POKE-THRU FLOOR BOX FOR POWER, 6-PORT DATA AND A/V. MANUFACTURER: LEGRAND BOX MODEL: 8ATC2PBK DATA PLATE MODEL: 8ATC6A SPEAKER WIRE PLATE MODEL: 8DEC (2 TOTAL) SPEAKER WIRE ACCESS STRAPS: WP1014 (2 TOTAL) BOTTOM HOUSING ASSEMBLY: 1150CHA BOTTOM HOUSING ASSEMBLY: 1125CHA

ELECTRICAL ABBREVIATIONS

@	"AT" OR "EACH AT"
A	AMPERE
AC	ABOVE COUNTER
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
ALM	ALARM
ASYM	ASYMMETRICAL
AT	AMPERE TRIP
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
BLDG	BUILDING
C	CONDUIT
°C	DEGREE CELSIUS
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CLOS	CLOSET
COMM	COMMUNICATION
CONT	CONTINUATION
CT	CURRENT TRANSFORMER
CU	COPPER
DEG	DEGREE
DISC	DISCONNECT
DN	DOWN
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EL	ELEVATION
ELEC	ELECTRICAL
EM	EMERGENCY
EQPT	EQUIPMENT
EXIST	EXISTING
EXT	EXTERIOR
°F	DEGREE FAHRENHEIT
FA	FIRE ALARM
FAP	FIRE ALARM PANEL
FBO	FURNISHED BY OTHERS
FIXT	FIXTURE
FL	FLOOR
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FT	FEET OR FOOT
G	GROUND
GFI	GROUND FAULT INTERUPTER
GND	GROUND
HC	HUNG CEILING
HP	HORSEPOWER
HZ	HERTZ
JB	JUNCTION BOX
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
LTG	LIGHTING
LV	LOW VOLTAGE
MAX	MAXIMUM
MECH	MECHANICAL
MFS	MAIN FUSED SWITCH
MIN	MINIMUM
N	NEUTRAL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PB	PULLBOX
ø	PHASE
PNL	PANEL
PWR	POWER
RECEPT	RECEPTACLE
REQ	REQUIRED
RM	ROOM
SCHED	SCHEDULE
SECT	SECTION
SP	SINGLE POLE
SPEC	SPECIFICATION
SW	SWITCH
SYM	SYMMETRICAL
SYS	SYSTEMS
TBD	TO BE DETERMINED
TEMP	TEMPERATURE
TYP	TYPICAL
UNF	UNFUSED
UON	UNLESS OTHERWISE NOTED
V	VOLT OR VOLTAGE
VA	VOLT AMPERE
W	WATT
WP	WEATHERPROOF

ELECTRICAL GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWING IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM AND SPACE CONDITIONS.
2. SEPARATE RACEWAYS FOR CONDUCTORS OF NORMAL AND EMERGENCY CIRCUITS. BOXES: PROVIDE BARRIERS BETWEEN EMERGENCY AND NORMAL WIRING.
3. FIRESTOPPING SHALL BE INSTALLED WHENEVER WIRING OR RACEWAYS CROSS FIRE RATED CONSTRUCTION.
4. HORIZONTAL OR CROSS RUNS IN PARTITIONS AND WALLS ARE NOT PERMITTED.
5. PROVIDE PULLBOXES AS, REQUIRED BY CODE AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRE. COORDINATE PULLBOX LOCATIONS WITH OTHER TRADES.
6. COVERS OF JUNCTION AND PULLBOXES SHALL BE READILY ACCESSIBLE.
7. WIRE COLOR CODING: AS PER CODE. WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION FOR OVERLAP COLOR TAPING OF CONDUCTORS (MINIMUM LENGTH 6") IN ACCESSIBLE LOCATIONS. COLOR CODING, ONCE SELECTED, MUST BE USED CONSISTENTLY FOR THE ENTIRE PROJECT.
8. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART.
9. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
10. LOCATIONS INDICATED FOR LOCAL WALL SWITCHES ARE SUBJECT TO MODIFICATIONS AT OR NEAR DOORS. COORDINATE WITH ARCHITECT AND INSTALL SWITCH ON SIDE OPPOSITE HINGE. VERIFY FINAL HINGE LOCATIONS IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.
11. CONTRACTOR SHALL REFER TO THE LATEST "CAMPUS NETWORK CABLE INSTALLATION SPECIFICATION AND SCOPE OF WORK" DOCUMENT FOR INFORMATION REGARDING THE INSTALLATION OF TELECOMMUNICATIONS CABLING AND PATHWAYS.

NYS ECC 2015 COMPLIANCE (LIGHTING)

ROOM	ROOM AREA (SQ. FT.)	WATTAGE	WATTS/SQ. FT.	ALLOWABLE WATTS	ALLOWABLE WATTS/SQ. FT.	LIGHTING CONTROLS
VESTIBULES	129	78	0.6	85.1	0.66	LIGHTS UNCONTROLLED
PERCEPTION LAB	2024	1200	0.6	2510	1.24	MANUAL-ON CONTROLS (VACANCY SENSORS WITH MANUAL OVERRIDE SWITCHES).
STORAGE	62	39	0.63	39	0.63	MANUAL-ON CONTROLS (VACANCY SENSORS WITH MANUAL OVERRIDE SWITCHES).
GALLERY	490	222	1.14	514.5	1.05	MANUAL-ON CONTROLS (VACANCY SENSORS WITH MANUAL OVERRIDE SWITCHES).
	TOTAL:	1539	--	3148.6	--	--

LIGHTING SCHEDULE

FIXTURE SYMBOL	FIXTURE DESCRIPTION	MANUFACTURER/MODEL #	LAMP TYPE	VOLTS	WATTS	NOTES:
	8' LINEAR INDIRECT/DIRECT LED LIGHTING FIXTURE	FINELITE/HP4-8-B-B-835-WSO-F-277-FA-FE-SC-C4	LED	277	74	0-10V DIMMING STANDARD DRIVER
	2x2 LED LIGHTING FIXTURE	PHILIPS DAY-BRITE/2SML45L835-2-FS12F-UNV-DIM	LED	120-277	39	0-10V DIMMING
	LIGHTING TRACK WITH LED SPOTLIGHTS	TRACK: ZUMTOBEL/HTEK4-4-3 END FEED: ZUMTOBEL/05014358 TRACK HEADS: PHILIPS LIGHTOLIER/LC-CH-10-835-W-TE HEAD REFLECTOR: PHILIPS LIGHTOLIER/LLM-RF ACCESSORY (ACCESSORY HOLDER): PHILIPS LIGHTOLIER/LC10AHWH ACCESSORY (DIFFUSION FILM): PHILIPS LIGHTOLIER/LC10SF	LED	277	12W/HEAD	ELV DIMMING
	WALL/CEILING-MOUNTED EXIT SIGN	DUALLITE/LE-(C/W)-S-R-X-W-E-I	LED	120-277	3.3	

ELECTRICAL DRAWING LIST

E-001	ELECTRICAL SYMBOLS LIST, ABBREVIATIONS, GENERAL NOTES, LIGHTING SCHEDULE, CODE COMPLIANCE AND DRAWING LIST
E-002	ELECTRICAL VISUAL ARTS BUILDING NORTH FIRST FLOOR PLAN
E-003	ELECTRICAL VISUAL ARTS BUILDING NORTH SECOND FLOOR PLAN
ED-101	ELECTRICAL DEMOLITION PLAN
ED-102	ELECTRICAL LIGHTING DEMOLITION PLAN
E-101	ELECTRICAL POWER/DATA PLAN
E-102	ELECTRICAL LIGHTING PLAN AND LIGHTING CONTROLS WIRING DIAGRAM
E-200	ELECTRICAL PANEL SCHEDULES AND DETAILS
E-300	ELECTRICAL SPECIFICATIONS

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PROJECT
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735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

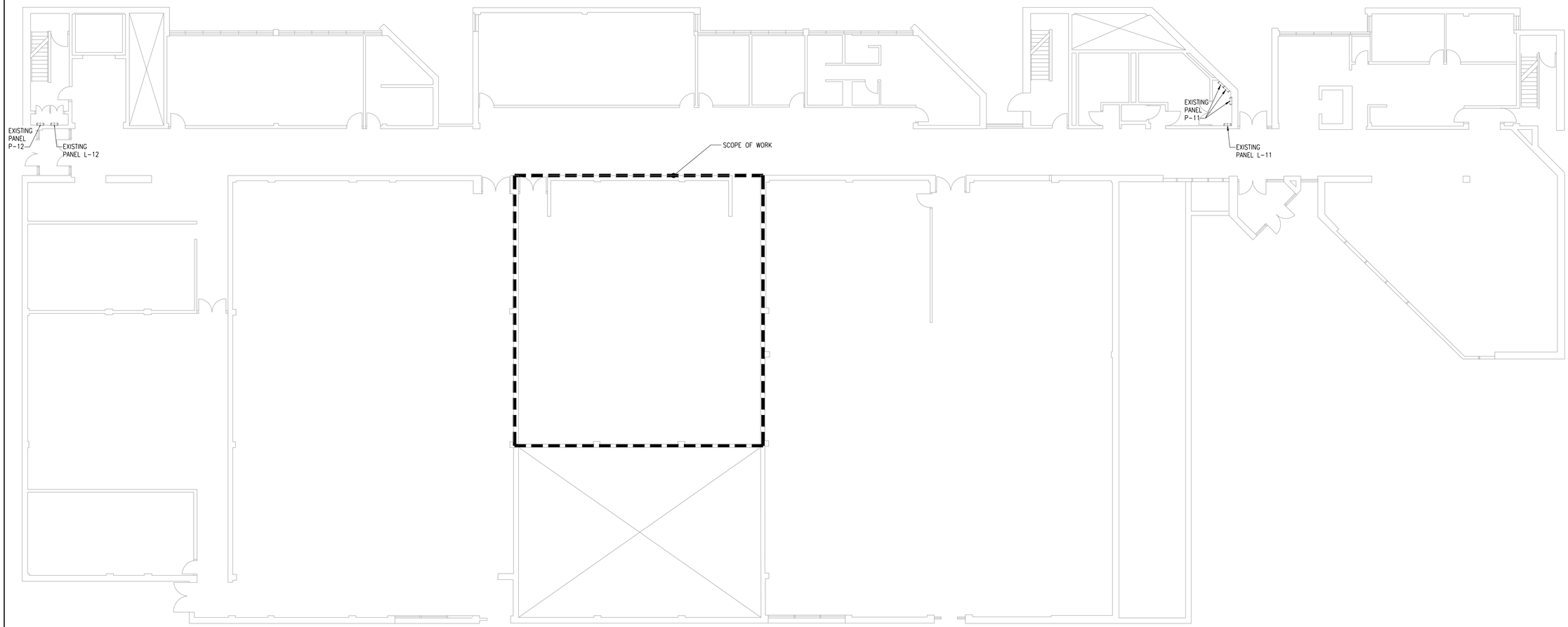
SEAL

ISSUED FOR: BID & PERMIT
ISSUED DATE: 02.11.2019

DRAWN BY: AR
CHECKED BY: DC
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
ELECTRICAL SYMBOLS, ABBREVIATIONS, GENERAL NOTES, LIGHTING SCHEDULE, CODE COMPLIANCE AND DRAWING LIST

DRAWING NO.
E-001



1 VISUAL ARTS BUILDING NORTH FIRST FLOOR PLAN
SCALE: 3/32" = 1'-0"

NOTE: PANEL LOCATIONS SHOWN FOR REFERENCE ONLY. ALL CIRCUITS SERVING PERCEPTION LAB TO BE RE-USED.

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735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

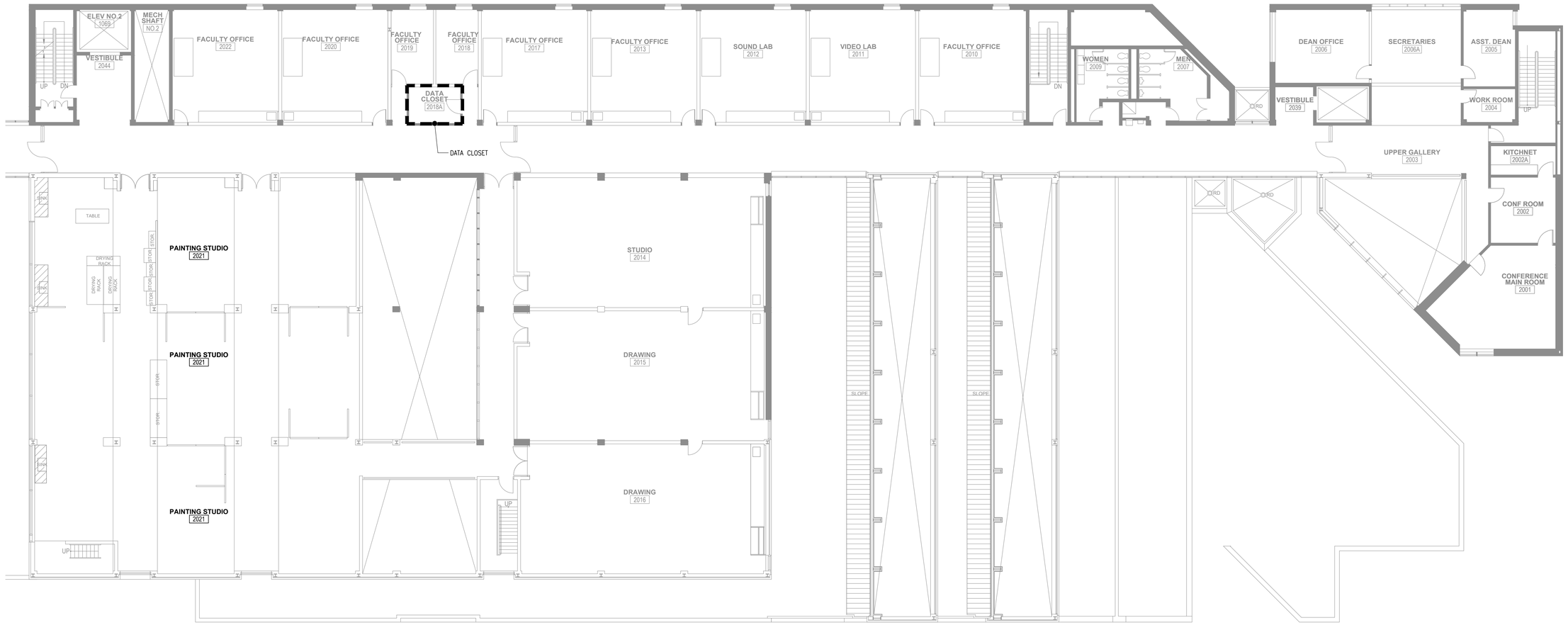
SEAL

ISSUED FOR: BID & PERMIT
ISSUED DATE: 02.11.2019

DRAWN BY: AR
CHECKED BY: DC
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
ELECTRICAL VISUAL ARTS BUILDING NORTH FIRST FLOOR PLAN

DRAWING NO.
E-002



1 VISUAL ARTS BUILDING NORTH SECOND FLOOR PLAN

SCALE: 3/32" = 1'-0"

NOTE: ALL DATA CABLES SHALL BE PROVIDED FROM DATA CLOSET ON SECOND FLOOR TO PERCEPTION LAB.

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PROJECT

SUNY PURCHASE COLLEGE

VISUAL ARTS PERCEPTION LAB RENOVATION

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

ISSUED FOR: BID & PERMIT

ISSUED DATE: 02.11.2019

DRAWN BY: AR

CHECKED BY: DC

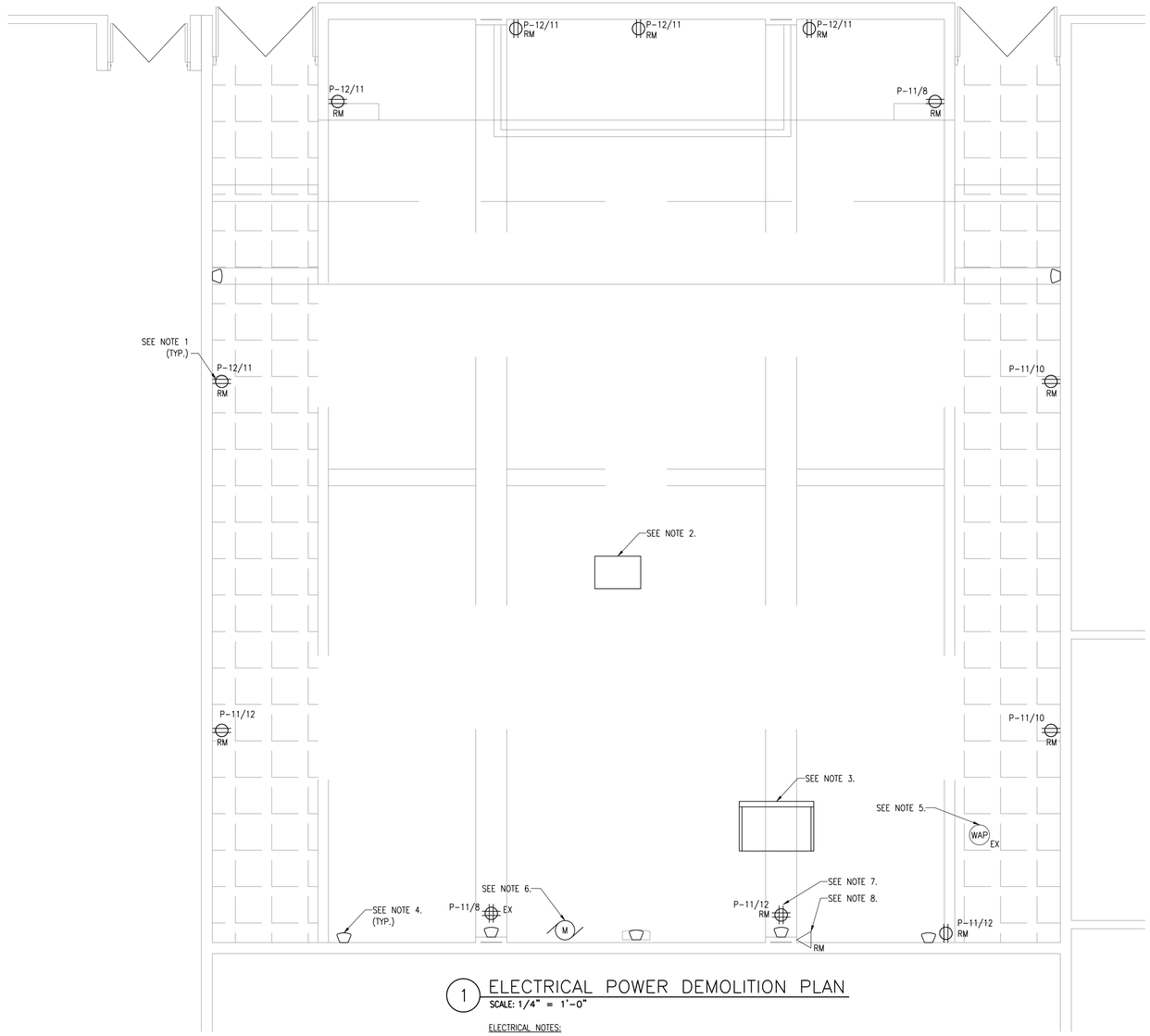
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME

ELECTRICAL VISUAL ARTS BUILDING NORTH SECOND FLOOR PLAN

DRAWING NO.

E-003



1 ELECTRICAL POWER DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

NOTE: RECEPTACLE CIRCUITS IDENTIFIED ARE FOR REFERENCE ONLY.

ELECTRICAL NOTES:

1. REMOVE EXISTING RECEPTACLE WITH ASSOCIATED WIRING. PROVIDE A JUNCTION BOX OUTSIDE AREA OF WORK AND PROVIDE BYPASS CONNECTIONS NECESSARY TO MAKE AFFECTED CIRCUITS CONTINUOUS. CIRCUITS TO BE EXTENDED TO NEW RECEPTACLES. SEE DRAWING E-101 FOR NEW RECEPTACLE LAYOUT.
2. EXISTING CEILING-MOUNTED PROJECTOR TO BE REMOVED UNDER SUPERVISION OF CAMPUS TECHNOLOGY SERVICES DEPARTMENT. PULL BACK ALL ASSOCIATED LOW-VOLTAGE AND POWER CONNECTIONS FROM PROJECTOR TO ACCOMMODATE CEILING WORK. THESE SHALL REMAIN FOR RE-INSTALLATION BY OTHERS.
3. EXISTING PODIUM TO BE DISCONNECTED BY CAMPUS AND REMOVED BY OTHERS.
4. EXISTING WALL-MOUNTED SPEAKER TO BE REMOVED UNDER SUPERVISION OF CAMPUS TECHNOLOGY SERVICES DEPARTMENT. DISCONNECT AND REMOVE ALL ASSOCIATED WIRING.
5. EXISTING CEILING-MOUNTED WIRELESS ACCESS POINT TO BE REMOVED UNDER SUPERVISION OF CAMPUS TECHNOLOGY SERVICES DEPARTMENT. DISCONNECT ALL CONNECTIONS FROM WIRELESS ACCESS POINT AND REMOVE ASSOCIATED WIRING AND CONDUIT FROM CEILING TO ACCOMMODATE CEILING WORK.
6. EXISTING MOTORIZED SCREEN TO BE REMOVED. DISCONNECT POWER CONNECTIONS AND PRESERVE FOR RE-USE.
7. REMOVE QUAD RECEPTACLE BEHIND PODIUM. EXISTING BOX AND WIRING TO REMAIN.
8. REMOVE DATA OUTLET. CABLING SHALL BE RE-ROUTED TO NEW JUNCTION BOX (REFER TO NOTE 9, DRAWING E-101).

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PROJECT

SUNY PURCHASE COLLEGE

VISUAL ARTS PERCEPTION LAB RENOVATION

735 ANDERSEN HILL RD
PURCHASE, NY 10577

REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

ISSUED FOR: BID & PERMIT

ISSUED DATE: 02.11.2019

DRAWN BY: AR

CHECKED BY: DC

PROJECT NUMBER: 20076

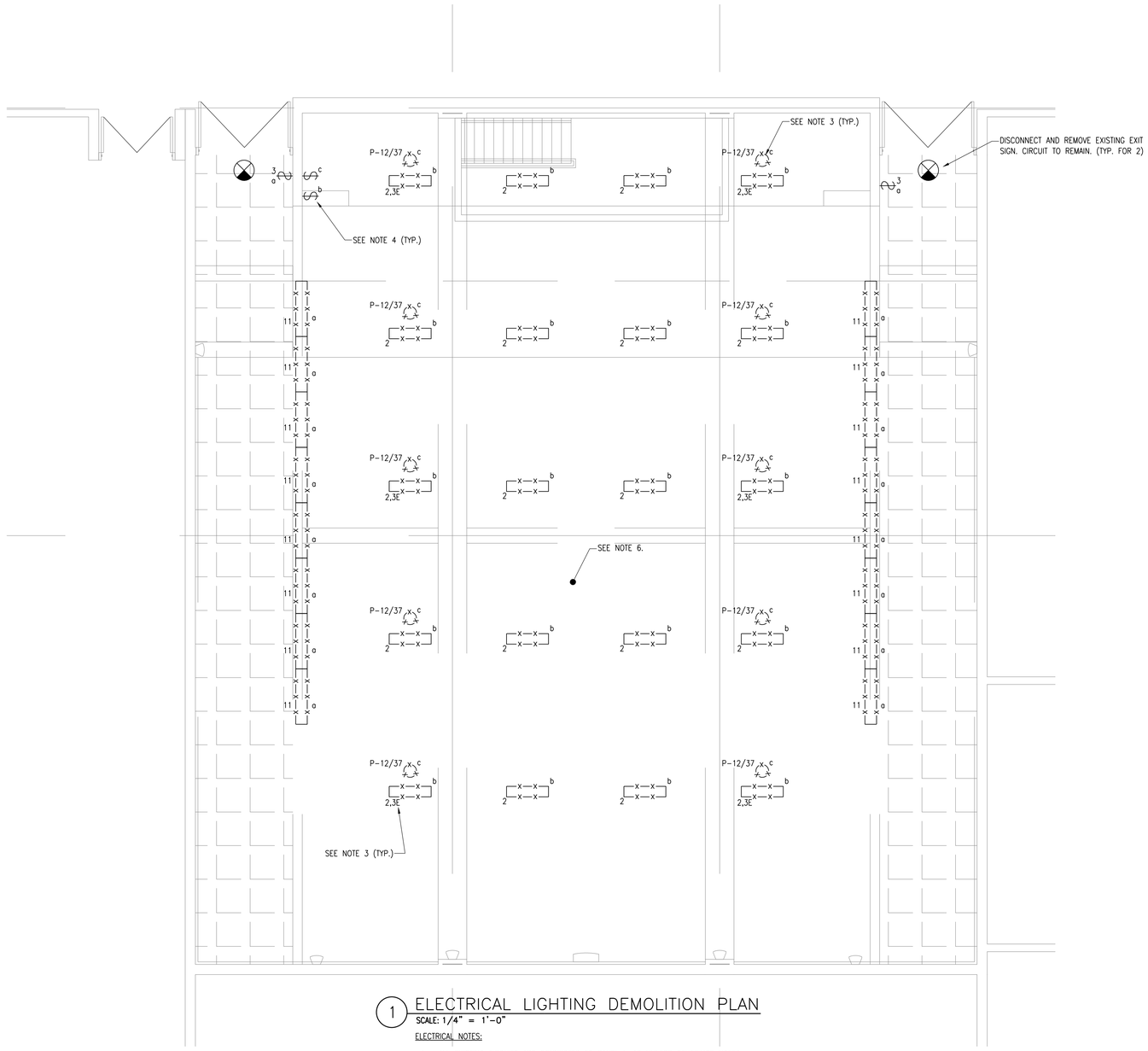
SU-021119

DRAWING NAME

ELECTRICAL DEMOLITION PLAN

DRAWING NO.

ED-101



1 ELECTRICAL LIGHTING DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

ELECTRICAL NOTES:

1. ALL EXISTING CIRCUITS ARE CONNECTED TO PANEL L-12 UNLESS OTHERWISE NOTED.
2. REMOVE ALL LIGHT FIXTURES INDICATED. RETAIN EXISTING 277V CIRCUITING (L-12/2, L-12/11) FOR INSTALLATION OF NEW FIXTURES.
3. FIXTURE IS ALSO CONNECTED TO EMERGENCY POWER CIRCUIT (EL-N/3). DISCONNECT THIS CIRCUIT AND RETAIN FOR FUTURE USE. (TYPICAL FOR 6 FIXTURES)
4. REMOVE EXISTING LIGHT SWITCHES WITH ASSOCIATED BOXES, WIRING, AND CONDUIT.
5. EXISTING 120V CIRCUIT (P-12/37) FEEDS LIGHT FIXTURES WHICH ARE NO LONGER USED. REMOVE LIGHT FIXTURES AND RETAIN CIRCUIT FOR USE AS RECEPTACLE CIRCUIT (REFER TO E-101).
6. ALL EXISTING WIRING AND CONDUIT SHALL BE REMOVED FROM CEILING TO ACCOMMODATE CEILING WORK. CIRCUITS SHALL BE REMOVED TO NEAREST LOCATION OUTSIDE AREA OF WORK AND SHALL REMAIN FOR EXTENSION TO NEW LIGHTING.

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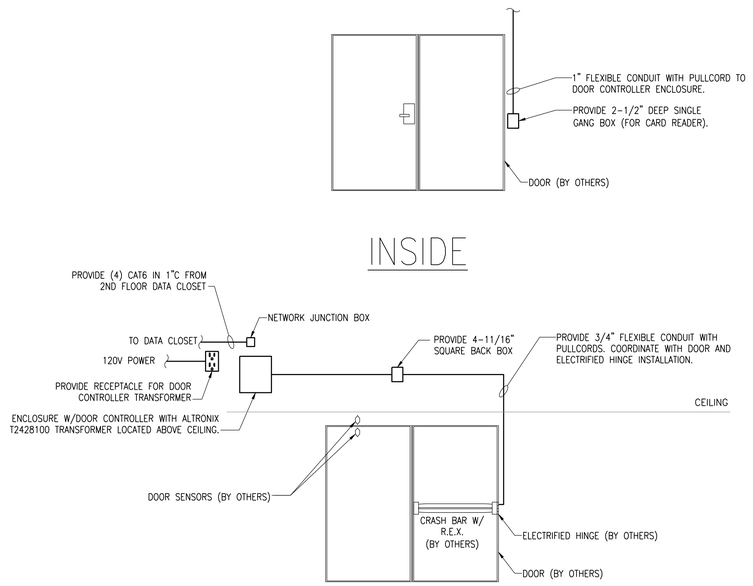
DRAWING NAME

ELECTRICAL LIGHTING DEMOLITION PLAN

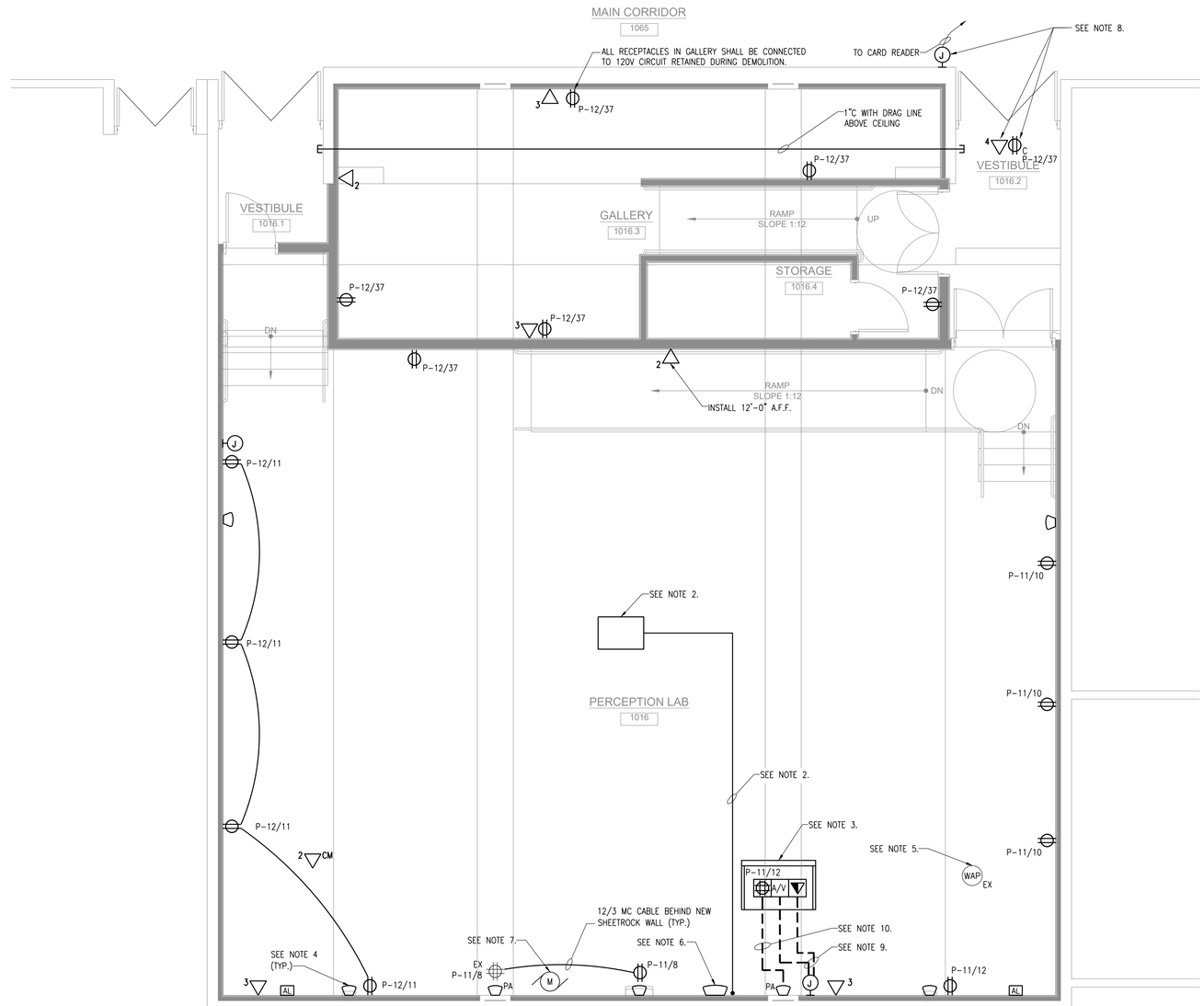
DRAWING NO.

ED-102



2 ELECTRICAL DOOR CONTROL WIRING DIAGRAM

SCALE: N.T.S.



1 ELECTRICAL POWER PLAN

SCALE: 1/4" = 1'-0"

ELECTRICAL NOTES:

1. ALL NEW RECEPTACLES SHALL BE FLUSH WITH NEW EXTENDED SHEETROCK WALL.
2. NEW CEILING-MOUNTED PROJECTOR TO BE RE-INSTALLED BY OTHERS. RE-EXTEND POWER WIRING AND CONDUIT DISCONNECTED DURING DEMOLITION AND PROVIDE NEW RECEPTACLE. ALSO PROVIDE (2) JUNCTION BOXES AT CEILING ABOVE PROJECTOR AND (2) JUNCTION BOXES ADJACENT TO PODIUM WITH 1" EMPTY CONDUIT CONNECTING EACH SET OF JUNCTION BOXES.
3. NEW PODIUM SPECIFIED BY A/V CONTRACTOR AND INSTALLED BY CAMPUS. EXTEND POWER AND LOW-VOLTAGE CONNECTIONS TO PODIUM.
4. NEW WALL-MOUNTED SPEAKER. COORDINATE EXACT LOCATION WITH CAMPUS. PROVIDE 1"C WITH DRAG LINE FROM EACH SPEAKER TO DATA OUTLET BOX ON COLUMN BEHIND PODIUM. SEE NOTE 9 ON THIS DRAWING. REFER TO DETAIL 1/DWG E-200 FOR MORE INFORMATION.
5. EXISTING CEILING-MOUNTED WIRELESS ACCESS POINT RE-INSTALLED BY CAMPUS. RE-EXTEND ALL ASSOCIATED WIRING AND CONDUIT.
6. NEW SUBWOOFER INSTALLED BY CAMPUS. PROVIDE 1"C WITH DRAG LINE TO PODIUM. COORDINATE EXACT LOCATIONS WITH CAMPUS.
7. EXISTING MOTORIZED SCREEN TO BE RE-INSTALLED. RE-EXTEND ALL ASSOCIATED WIRING AND CONDUIT (PROVIDE EXTENSION BOX AS NECESSARY).
8. COORDINATE DOOR CONTROL EQUIPMENT LOCATIONS ABOVE VESTIBULE CEILING WITH ACCESS PANEL INSTALLATION TO ENSURE SERVICEABILITY. REFER TO DETAIL 2 ON THIS DRAWING FOR DOOR CONTROL WIRING DIAGRAM.
9. PROVIDE FLUSH JUNCTION BOX FOR ALL DATA AND A/V CABLING TO PODIUM. (1) 1-1/2"C AND (1) 1-1/4"C FROM NEW JUNCTION BOX SHALL TRAVEL UNDER FLOOR SLAB TO POKE-THRU DEVICE BENEATH PODIUM. REFER TO DETAILS 1, 2 AND 3/DWG E-200 FOR MORE INFORMATION.
10. EXTEND WIRING AND CONDUIT (2#12 + 1#12G IN 3/4"C) FROM POWER JUNCTION BOX RETAINED DURING DEMOLITION BELOW FLOOR SLAB TO POKE-THRU DEVICE BENEATH PODIUM. REFER TO DETAILS 2 AND 3/DWG E-200 FOR MORE INFORMATION.

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DRAWN BY: AR
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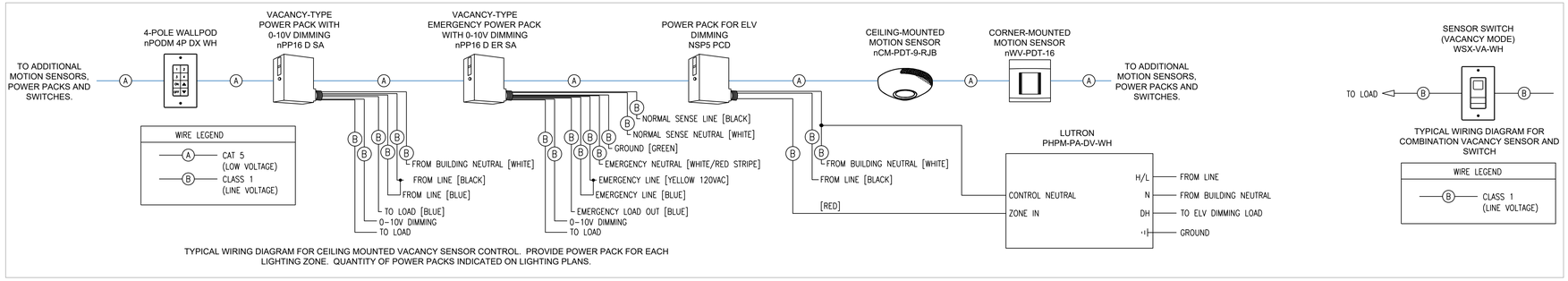
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
ELECTRICAL POWER/DATA PLAN

DRAWING NO.
E-101



TYPICAL WIRING DIAGRAM FOR CEILING MOUNTED VACANCY SENSOR CONTROL. PROVIDE POWER PACK FOR EACH LIGHTING ZONE. QUANTITY OF POWER PACKS INDICATED ON LIGHTING PLANS.

TYPICAL WIRING DIAGRAM FOR COMBINATION VACANCY SENSOR AND SWITCH

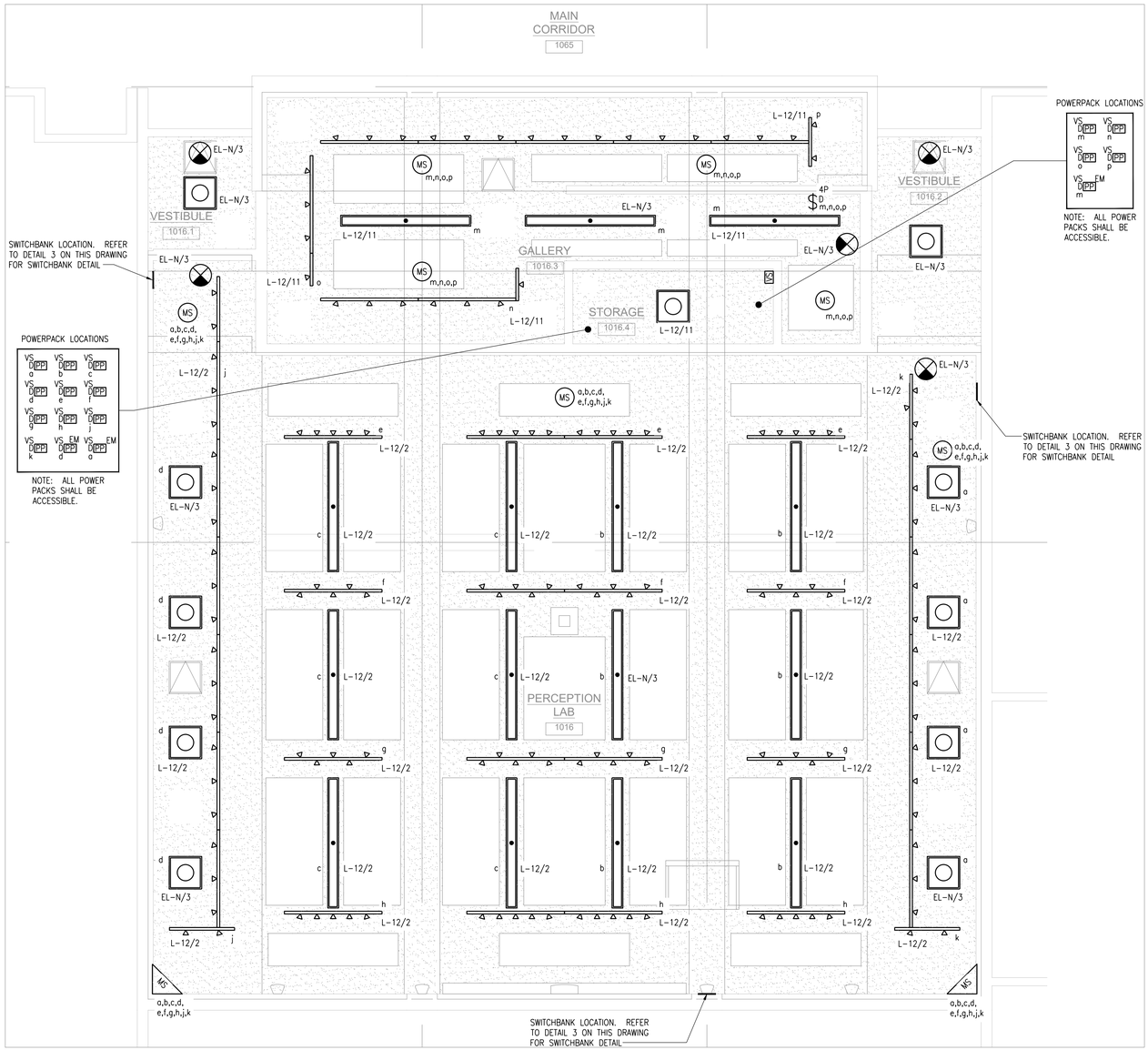
2 LIGHTING CONTROLS TYPICAL WIRING DIAGRAM

SCALE: N/A

4P D a,b,c,d 4P D e,f,g,h 2P D j,k

3 SWITCHBANK DETAIL

SCALE: N/A



1 ELECTRICAL LIGHTING PLAN

SCALE: 1/4" = 1'-0"

NOTE: ALL CONDUITS SHALL BE CONCEALED WITHIN NEW GYPSUM BOARD AND HUNG CEILINGS.

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DRAWN BY: AR
CHECKED BY: DC
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
ELECTRICAL LIGHTING PLAN

DRAWING NO.
E-102

PANEL NO. P-11 **SECTION** 1 — EXISTING PANEL — ☐RECESSED ☐SURFACE MOUNTED — ☐MAIN LUG ONLY ☐MAIN CB ☐FEED THRU LUG — **REV. DATE** _____ **REV. DATE** _____ **REV. DATE** _____

VOLTS 120/208 **PH** 3 **W** 4 **G** 1

MAIN CB _____ **BUS** _____ **MIN. INTERRUPTING RATING** _____ **SYMM.**

CKT NO.	TRIP (AMPS)	DESCRIPTION OF LOAD	LOAD (AMPS)	PER PHASE AMPS A	B	C	LOAD (AMPS)	DESCRIPTION OF LOAD	TRIP (AMPS)	CKT NO.	
1	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	2	
3	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	4	
5	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	6	
7	20	EXISTING CIRCUIT	0	7.5			7.5	**PERCEPTION LAB RECEPTACLES**	**20**	8	1
9	20	EXISTING CIRCUIT	0		9		9	**PERCEPTION LAB RECEPTACLES**	**20**	10	1
11	20	EXISTING CIRCUIT	0			12	12	**PERCEPTION LAB RECEPTACLES**	**20**	12	1
13	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	14	
15	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	16	
17	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	18	
19	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	20	
21	100	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	22	
23			0			0	0	EXISTING CIRCUIT	20	24	
				7.5	9	12					

PANEL NO. P-12 **SECTION** 1 — EXISTING PANEL — ☐RECESSED ☐SURFACE MOUNTED — ☐MAIN LUG ONLY ☐MAIN CB ☐FEED THRU LUG — **REV. DATE** _____ **REV. DATE** _____ **REV. DATE** _____

VOLTS 120/208 **PH** 3 **W** 4 **G** 1

MAIN CB _____ **BUS** _____ **MIN. INTERRUPTING RATING** _____ **SYMM.**

CKT NO.	TRIP (AMPS)	DESCRIPTION OF LOAD	LOAD (AMPS)	PER PHASE AMPS A	B	C	LOAD (AMPS)	DESCRIPTION OF LOAD	TRIP (AMPS)	CKT NO.	
1	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	2	
3	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	4	
5	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	6	
7	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	8	
9			0		0		0			10	
11	20	PERCEPTION LAB RECEPTACLES	9			9	0	EXISTING CIRCUIT	20	12	1
13	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	14	
15	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	16	
17	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	30	18	
				0	0	9					

PANEL NO. P-12 **SECTION** 2 — EXISTING PANEL — ☐RECESSED ☐SURFACE MOUNTED — ☐MAIN LUG ONLY ☐MAIN CB ☐FEED THRU LUG — **REV. DATE** _____ **REV. DATE** _____ **REV. DATE** _____

VOLTS 120/208 **PH** 3 **W** 4 **G** 1

MAIN CB _____ **BUS** _____ **MIN. INTERRUPTING RATING** _____ **SYMM.**

CKT NO.	TRIP (AMPS)	DESCRIPTION OF LOAD	LOAD (AMPS)	PER PHASE AMPS A	B	C	LOAD (AMPS)	DESCRIPTION OF LOAD	TRIP (AMPS)	CKT NO.	
17	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	18	
19	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	20	
21	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	22	
23	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	24	
25	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	26	
27	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	28	
29	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	30	
31	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	32	
33	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	34	
35	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	36	
37	20	PERCEPTION LAB/GALLERY RECEPTACLES	10.5		10.5		0	EXISTING CIRCUIT	20	38	2
39	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	40	
41	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	42	
43	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	44	
45	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	46	
47	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	48	
49	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	50	
51	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	52	
53	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	54	
55	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	100	56	
57	20	EXISTING CIRCUIT	0			0	0			58	
				0	10.5	0					

PANEL NO. L-11 **SECTION** _____ — ☐RECESSED ☐SURFACE MOUNTED — ☐MAIN LUG ONLY ☐MAIN CB ☐FEED THRU LUG — **REV. DATE** _____ **REV. DATE** _____ **REV. DATE** _____

VOLTS 277/480 **PH** 3 **W** 4 **G** 1

MAIN CB _____ **BUS** _____ **MIN. INTERRUPTING RATING** _____ **SYMM.**

CKT NO.	TRIP (AMPS)	DESCRIPTION OF LOAD	LOAD (AMPS)	PER PHASE AMPS A	B	C	LOAD (AMPS)	DESCRIPTION OF LOAD	TRIP (AMPS)	CKT NO.	
1	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	2	
3	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	4	
5	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	6	
7	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT		8	
9	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	100	10	
11	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT		12	
13	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	14	
15	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT		16	
17	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	100	18	
19	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT		20	
				0	0	0					

PANEL NO. L-12 **SECTION** _____ — ☐RECESSED ☐SURFACE MOUNTED — ☐MAIN LUG ONLY ☐MAIN CB ☐FEED THRU LUG — **REV. DATE** _____ **REV. DATE** _____ **REV. DATE** _____

VOLTS 277/280 **PH** 3 **W** 4 **G** 1

MAIN CB _____ **BUS** _____ **MIN. INTERRUPTING RATING** _____ **SYMM.**

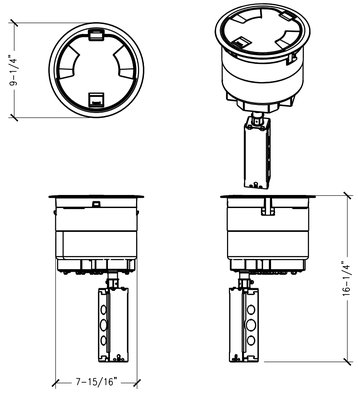
CKT NO.	TRIP (AMPS)	DESCRIPTION OF LOAD	LOAD (AMPS)	PER PHASE AMPS A	B	C	LOAD (AMPS)	DESCRIPTION OF LOAD	TRIP (AMPS)	CKT NO.	
1	20	EXISTING CIRCUIT	0	8.8			8.8	**PERCEPTION LAB LIGHTING**	**20**	2	2
3	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	4	
5	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	6	
7	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	8	
9	20	EXISTING CIRCUIT	0		0		0	EXISTING CIRCUIT	20	10	
11	**20**	**PERCEPTION LAB LIGHTING**	2.2			2.2	0	EXISTING CIRCUIT	20	12	2
13	20	EXISTING CIRCUIT	0	0			0	EXISTING CIRCUIT	20	14	
15	20	EXISTING CIRCUIT	0		0		0	SPACE		16	
17	20	EXISTING CIRCUIT	0			0	0	EXISTING CIRCUIT	20	18	
19	20	EXISTING CIRCUIT	0	0			0			20	
21		SPACE	0		0		0	EXISTING CIRCUIT	20	22	
23		SPACE	0			0	0			24	
25		SPACE	0	0			0	SPACE		26	
				8.8	0	2.2					

PANEL SCHEDULE NOTE:

PANEL SCHEDULES SHOWN FOR INFORMATIONAL PURPOSES ONLY

PANEL SCHEDULE KEY NOTES

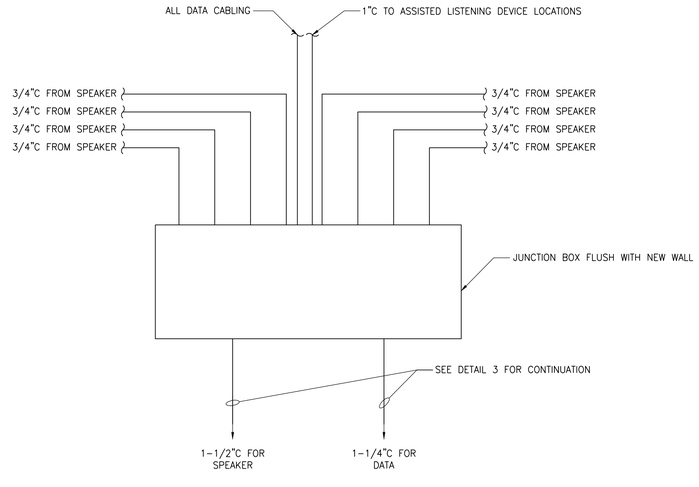
1. REUSE EXISTING CIRCUIT TO FEED NEW RECEPTACLES IN PERCEPTION LAB.
2. REUSE EXISTING LIGHTING CIRCUIT TO FEED NEW RECEPTACLES IN GALLERY.



2 ELECTRICAL POKE-THRU DETAIL 2

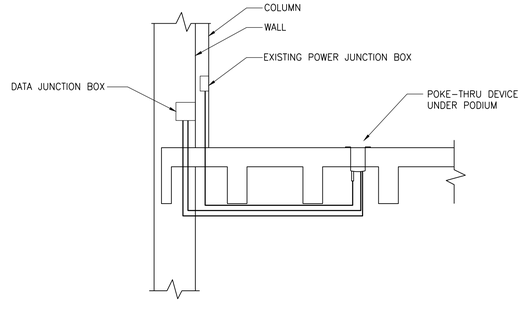
SCALE: N/A

NOTE: REFER TO SYMBOLS LIST FOR SPECS.



1 ELECTRICAL POKE-THRU DETAIL 1

SCALE: N/A



3 ELECTRICAL POKE-THRU DETAIL 3

SCALE: N/A

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DRAWING NAME

ELECTRICAL PANEL SCHEDULES AND DETAILS

DRAWING NO.

E-200

ELECTRICAL WORK

1. GENERAL:

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.

B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR.

C. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.

F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.

J. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

K. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

L. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

M. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

N. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC) AND CONDITIONS.

O. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

2. SCOPE OF WORK:

A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.

B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. SHOP DRAWINGS

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

1) PROJECT NAME AND LOCATION
2) NAME OF ARCHITECT AND ENGINEER
3) ITEM IDENTIFICATION
4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS:

1) CONTRACTOR SHALL SUBMIT A PDF OR TIFF FILE TO ARCHITECT THROUGH PREVIOUSLY DISCUSSED AND APPROVED METHOD (EMAIL, SUBMITTAL EXCHANGE PROGRAM, ETC). SUBMITTAL WILL THEN BE FORWARDED TO RELEVANT PARTIES FOR REVIEW.
2) UNLESS OTHERWISE DISCUSSED & AGREED, PROVIDE ALL EQUIPMENT SUBMITTALS AND SHOP DRAWINGS AT ONE TIME, THE SAME TIME; AT LEAST, THREE WEEKS BEFORE A RESPONSE IS REQUIRED.
3) PROVIDE A SEPARATE TRANSMITTAL FOR EACH SUBMITTAL ITEM. TRANSMITTALS SHALL INDICATE PRODUCT BY SPECIFICATION SECTION NAME AND NUMBER. SEPARATE ALL SUBMITTALS INTO APPROPRIATE SPECIFICATION SECTION NUMBER. DO NOT COMBINE SPECIFICATION SECTIONS.
4) DO NOT SUBMIT ENTIRE MANUFACTURER'S CATALOG; IT WILL NOT BE REVIEWED. SUBMIT ONLY PAGES WHICH ARE PERTINENT TO THE PROJECT. ALL OPTIONS WHICH ARE INDICATED ON THE PRODUCT DATA SHALL BECOME PART OF THE CONTRACT AND SHALL BE REQUIRED WHETHER SPECIFIED ARE NOT.
5) MARK EACH COPY OF STANDARD PRINTED DATA TO IDENTIFY PERTINENT PRODUCTS, REFERENCED TO SPECIFICATION SECTION AND ARTICLE NUMBER.
6) SHOW REFERENCE STANDARDS, PERFORMANCE CHARACTERISTICS AND CAPACITIES; WIRING AND PIPING DIAGRAMS AND CONTROLS; COMPONENT PARTS; FINISHES; DIMENSIONS AND REQUIRED CLEARANCES.
7) MODIFY MANUFACTURER'S STANDARD SCHEMATIC DRAWINGS AND DIAGRAMS TO SUPPLEMENT STANDARD INFORMATION AND TO PROVIDE INFORMATION SPECIFICALLY APPLICABLE TO THE WORK. DELETE INFORMATION NOT APPLICABLE.

8) THE ENGINEER WILL REVIEW THE ORIGINAL SUBMITTAL AND ONE RESUBMITTAL FOR THE SAME PRODUCT. ADDITIONAL RESUBMITTALS WILL BE REVIEW ON A HOURLY RATE, PAYABLE BY THE CONTRACTOR.
9) PARTIAL SUBMITTALS OR SUBMITTALS NOT PROPERLY FORMATTED AS INDICATED ABOVE, ARE SUBJECT TO RETURN WITHOUT REVIEW FOR THE CONTRACTOR TO CORRECT.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

1) WIRE AND CABLE
2) WALL SWITCHES
3) INSERTION RECEPTACLES
4) LIGHTING FIXTURES.

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

B. DEFINITIONS:

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
3) "FURNISH" OR "SUPPLY: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.
6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

C. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. COST OF ENERGY WILL BE PAID FOR BY OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

D. QUALITY ASSURANCE

1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
3) CURRENT CHARACTERISTICS:
   a. DISTRIBUTION: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
4) HEIGHTS OF OUTLETS: FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
   a. RECEPTACLES: 1 FT-6 IN.
   b. WALL SWITCHES: 4 FT-0 IN.

   EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.

E. PRODUCT DELIVERY, STORAGE AND HANDLING

1) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

F. MATERIALS

1) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
2) INSERTS AND SUPPORTS:
   a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
   - SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
   - MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
   - CLIP FORM NAILS FLUSH WITH INSERTS.
   - MAXIMUM LOADING 75 PERCENT OF RATING.
   b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
   c. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

G. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

H. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

I. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.

J. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

6. RACEWAYS:

F. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.

G. MATERIALS

1) RACEWAYS:
   a. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
   b. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
2) FITTINGS AND ACCESSORIES:
   a. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
   b. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
   c. BUSHINGS: METALLIC INSULATED TYPE.
3) BOXES:
   a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 277/480 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

H. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. FOR ABOVE FLOOR FITTINGS, TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

I. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

J. JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

K. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.

L. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

7. WIRE AND CABLE:

A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM.

OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

C. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED.

D. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF BX.

E. COLOR CODING SHALL BE AS FOLLOWS:

1) 120/208 VOLT SYSTEM:
   BLACK FOR A PHASE
   RED FOR B PHASE
   BLUE FOR C PHASE
2) 277/480 VOLT SYSTEM:
   BROWN FOR A PHASE
   ORANGE FOR B PHASE
   YELLOW FOR C PHASE
3) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

F. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING, INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

G. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

H. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 °F.

I. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

J. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 10 PERCENT OF BRANCH CIRCUITS.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

9. DEVICES:

A. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.

B. INSERTION RECEPTACLES SHALL BE SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT. GROUNDED, EXCEPT AS NOTED. MEETING NEMA STANDARDS, PUBLICATION WD-1-1971. SIMILAR TO HUBBELL NOS. 5362 (20 AMP) AND 5262 (15 AMP).

1) SINGLE, EXCEPT AS NOTED:

   a. 20 AMP STRAIGHT BLADE, SIMILAR TO HUBBELL NO. 5361.

   b. 125 VOLT, 2 POLE, 3 WIRE, GROUNDED.

2) SPECIAL USE: NONINTERCHANGEABLE TYPES AND RATINGS.

D. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.

E. COLORS: COORDINATE COLORS WITH ARCHITECT.

F. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

10. LIGHTING FIXTURES:

A. PROVIDE FIXTURES ("LUMINARIES"), COMPONENTS AND LAMPS. FIXTURES SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.

B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.

11. TELEPHONE CONDUIT SYSTEM:

A. PROVIDE COMPLETE SYSTEM OF: EMPTY CONDUIT, PULL BOXES, OUTLETS, SLEEVES AND FISHWIRES.

B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE COMPANY.

C. OUTLETS SHALL BE:

1) ALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.
2) FLOOR: CAST IRON WITH LOW TENSION FITTING.

D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.

E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET TO NEAREST ACCESSIBLE HUNG CEILING.

12. GROUNDING

A. GROUND CABLES SHALL BE BARE OR GREEN COLOR CODED, INSULATED, ANNEALED STRANDED TINNED COPPER WIRE AS INDICATED ON DRAWINGS.

B. PROVIDE CONTINUOUS GROUND PATH FOR ALL ELECTRICAL CIRCUITS, FROM POINT OF UTILIZATION BACK TO SOURCE THROUGH GROUND WIRES, CONDUIT RUNS, AND RELATED ITEMS.

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REVISIONS

REV	DATE	DESCRIPTION / COMMENTS

SEAL

ISSUED FOR: BID & PERMIT
ISSUED DATE: 02.11.2019
DRAWN BY: AR
CHECKED BY: DC
PROJECT NUMBER: 20076
SU-021119

DRAWING NAME
ELECTRICAL SPECIFICATIONS

DRAWING NO.
E-300