

SUBMIT BID TO:
PROCUREMENT SERVICES
UNIVERSITY OF FLORIDA
971 ELMORE DRIVE
GAINESVILLE, FL 32611

Phone: (352) 392-1331 - FAX: (352) 392-8837
 Web Address: <https://procurement.ufl.edu/>



INVITATION TO BID

Construction Acknowledgment Form

Page 1 of 242 pages		BID WILL BE OPENED: June 12, 2018 at 3:00PM local time and may not be withdrawn within 90 days after such date and time. Non-mandatory Pre-bid Meeting May 16, 2018 at 2:00PM local time.		BID NO.: ITB18KO-131	
DATE: 05/03/18		PROCUREMENT AGENT: KO/jh		BID TITLE: Building 700 Renovation – Phase 2	
VENDOR NAME					
VENDOR MAILING ADDRESS		REASON FOR NOT SUBMITTING BID			
CITY - STATE - ZIP CODE		POSTING OF BID TABULATIONS			
AREA CODE	TELEPHONE NO.	Bid tabulations with intended award(s) will be posted electronically for review by interested parties at https://procurement.ufl.edu/ and will remain posted for a period of 72 hours excluding Saturdays, Sundays, or state holidays. Failure to file a protest in accordance with Board of Governors (BOG) Regulation 18.002 or failure to post the bond or other security as required in the BOG regulations 18.002 and 18.003(3), shall constitute a waiver of protest proceedings.			
	FAX NO.				
	WEB ADDRESS				
	EMAIL ADDRESS				

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a bid for the same materials, supplies, or equipment and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the vendor and that the vendor is in compliance with all the requirements of the Invitation to Bid, including but not limited to, certification requirements. In submitting a bid on behalf of the Board of Trustees, hereinafter known as the University, the vendor offers and agrees that if the bid is accepted the vendor will convey, sell, assign, or transfer to the University all rights, title and interest in and to all causes of action it may now or hereafter acquire under the Anti-trust laws of the United States and the University for price fixing relating to the particular commodities or services purchased or acquired by the University. At the University's discretion, such assignment shall be made and become effective at the time the purchasing agency tenders final payment to the vendor.

 AUTHORIZED SIGNATURE (MANUAL)

 NAME AND TITLE (TYPED)

GENERAL CONDITIONS

SEALED BIDS: All bid sheets and this form must be executed and submitted in a sealed envelope. (DO NOT INCLUDE MORE THAN ONE BID PER ENVELOPE.) The face of the envelope shall contain, in addition to the above address, the date, and time of the bid opening and the bid number. Bids not submitted on the attached bid form shall be rejected. All bids are subject to the conditions specified herein. Those which do not comply with these conditions are subject to rejection.

1. **EXECUTION OF BID:** Bid must contain an original manual signature of authorized representative in the space provided above. Bid must be typed or printed in ink. Use of erasable ink is not permitted. All corrections to prices made by vendor must be initialed.

2. **NO BID:** If not submitting a bid, respond by returning only this vendor acknowledgment form, marking it "NO BID", and explain the reason in the space provided above. Failure to respond to a procurement solicitation without giving justifiable reason for such failure, nonconformance to contract conditions, or other pertinent factors deemed reasonable and valid shall be cause for removal of the supplier's name from the bid mailing list. NOTE: To qualify as a respondent, vendor must submit a "NO BID", and it must be received no later than the stated bid opening date and hour.

3. **BID OPENING:** Shall be public, on the date, location and the time specified on the bid form. It is the vendor's responsibility to assure that the bid is delivered at the proper time and place of the bid opening. Bids which for any reason are not so delivered will not be considered. A bid may not be altered after opening of the bids. NOTE: Bid tabulations will be posted electronically at <https://procurement.ufl.edu/>. Bid tabulations will not be provided by telephone.

4. **PRICES, TERMS AND PAYMENT:** Firm prices shall be bid and will include all packing, handling, shipping charges, and delivery to the destination shown herein.

(a) **TAXES:** The University does not pay Federal Excise and Sales taxes on direct purchases of tangible personal property or services. The Florida Tax Exempt Number is 11-06-024056-57C. This exemption does not apply to purchases of tangible personal property or services made by vendors who use the tangible personal property or services in the performance of contracts for the improvement of University-owned real property as defined in Chapter 192, F.S.

(b) **DISCOUNTS:** Vendors are encouraged to reflect trade discounts in the unit prices quoted; however, vendors may offer a discount for prompt payment. Prompt payment discounts will not be considered in the bid award. However, every effort will be made to take the discount within the time offered.

(c) **MISTAKES:** Vendors are expected to examine the specifications, delivery schedule, bid prices, extensions, and all instructions pertaining to supplies and

services. Failure to do so will be at vendor's risk. In case of a mistake in extensions the unit price will govern.

(d) **INVOICING AND PAYMENT:** Payment will be made by the University of Florida after the items awarded to a vendor have been received, inspected, and found to comply with award specifications, free of damage or defect and properly invoiced. All invoices shall bear the purchase order number. Payment for partial shipments shall not be made unless specified. An original invoice shall be submitted. Failure to follow these instructions may result in delay in processing invoices for payment. Payment shall be made in accordance with Section 215.422 (1) (2) F.S. VENDOR OMBUDSMAN: The University's vendor ombudsman, whose duties include acting as an advocate for vendors may be experiencing problems in obtaining payment from the University, may be contacted at 352-392-1241.

(e) **ANNUAL APPROPRIATIONS:** The University's performance and obligation to pay under any contract awarded is contingent upon an annual appropriation by the Legislature.

(f) **CONDITION AND PACKAGING:** It is understood and agreed that any item offered or shipped as a result of this bid shall be a new, current standard production model available at the time of this bid. All containers shall be suitable for storage or shipment, and all prices shall include standard commercial packaging.

(g) **SAFETY STANDARDS:** Unless otherwise stipulated in the bid, all manufactured items and fabricated assemblies shall comply with applicable requirements of Occupational Safety and Health Act and any standards hereunder.

5. **CONFLICT OF INTEREST:** The award hereunder is subject to the provisions of Chapter 112, F.S. All vendors must disclose with their bid the name of any officer, director, or agent who is also an employee of the University of Florida. Further, all vendors must disclose the name of any University employee who owns, directly or indirectly, an interest of five percent (5%) or more in the vendor's firm or any of its branches.

6. **AWARDS:** As the best interest of the University may require, the right is reserved to make award(s) by individual item, group of items, all or none or a combination thereof; to reject any and all bids or waive any minor irregularity or technicality in bids received. When it is determined there is no competition to the lowest responsible vendor, evaluation of other bids are not required. Vendors are cautioned to make no assumptions unless their bid has been evaluated as being responsive.

7. **INTERPRETATIONS/DISPUTES:** Any questions concerning conditions or specifications shall be directed in writing to Procurement Services. Inquiries must reference the date of bid opening and bid number. No interpretations shall be considered binding unless provided in writing by the University in response to requests in full compliance with this provision.

8. NOTICE OF BID PROTEST BONDING REQUIREMENT: Any person or entity who files an action protesting a decision or an intended decision pertaining to a competitive solicitation shall at the time of filing the formal protest, post with the University a bond payable to the University in an amount equal to: 10% of the estimated value of the protestor's bid or proposal; 10% of the estimated expenditure during the contract term; \$10,000.00; or whichever is less. The bond shall be conditioned upon the payment of all costs which may be adjudged against the person or entity filing the protest action. In lieu of a bond, the University may accept a cashier's check, bank official check or money order in the amount of the bond. **FAILURE OF THE PROTESTING PERSON OR ENTITY TO FILE THE REQUIRED BOND, CASHIER'S CHECK, BANK OFFICIAL CHECK OR MONEY ORDER AT THE TIME OF THE FILING THE FORMAL PROTEST SHALL RESULT IN DENIAL OF THE PROTEST.**

9. GOVERNMENTAL RESTRICTIONS: In the event any governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship or performance of the items offered in this bid prior to their delivery, it shall be the responsibility of the successful vendor to notify the purchaser at once, indicating in writing the specific regulation which requires an alteration. The University reserves the right to accept any such alteration, including any price adjustments occasioned thereby, or to cancel the contract at no expense to the University.

10. LEGAL REQUIREMENTS: Applicable provision of all Federal, State, county and local laws, and of all ordinances, rules and regulations shall govern development, submittal and evaluation of all bids received in response hereto and shall govern any and all claims and disputes which may arise between person(s) submitting a bid response hereto and the University, by and through its officers, employees and authorized representatives, or any other person, natural or otherwise: and lack of knowledge by any vendor shall not constitute a cognizable defense against the legal effect thereof.

11. LOBBYING: Vendor is prohibited from using funds provided under any contract or purchase order for the purpose of lobbying the Legislature or any official, officer, commission, board, authority, council, committee, or department of the executive branch or the judicial branch of state government.

12. ADVERTISING: In submitting a bid, the vendor agrees not to use the results therefrom as a part of any commercial advertising. Vendor may not use the names, logos, or trademarks of the University, its employees, or affiliates without the prior written consent of the University.

13. ASSIGNMENT: Any contract or purchase order issued pursuant to this Invitation to Bid and the monies which may become due hereunder are not assignable except with the prior written approval of the purchaser.

14. LIABILITY: The vendor agrees to indemnify and save the University of Florida, the State of Florida and the Florida Board of Governors, their officers, agents, and employees harmless from any and all judgments, orders, awards, costs and expenses, including attorney's fees, and also all claims on account of damages to property, including loss of use thereof, or bodily injury (including death) which may be hereafter sustained by the vendor, its employees, its subcontractors, or the University of Florida, the State of Florida and the Florida Board of Governors, their officers, agents, or employees, or third persons, arising out of or in connection with any contract awarded and which are the result of the vendor's breach of contract or of the negligent acts of the vendor, its officers, agents, and employees. This clause does not apply to contracts between government agencies.

15. FACILITIES: The University reserves the right to inspect the vendor's facilities at any time with prior notice.

16. ADDITIONAL QUANTITIES: For a period not exceeding ninety (90) days from the date of acceptance of any offer by the University of Florida, the right is reserved to acquire additional quantities up to but not exceeding those shown on bid or the bid level at the prices bid in this invitation. If additional quantities are not acceptable, the bid sheets must be noted "BID IS FOR SPECIFIED QUANTITY ONLY".

17. SERVICE AND WARRANTY: Unless otherwise specified, the vendor shall define any warranty service and replacements that will be provided during and subsequent to this contract. Vendors must explain on an attached sheet to what extent warranty and service facilities are provided.

18. SAMPLES: Samples of items, when called for, must be furnished free of expense, on or before bid opening time and date, and if not destroyed, may upon request, be returned at the vendor's expense. Each individual sample must be labeled with vendor's name, manufacturer's brand name and number, bid number and item reference. Request for return of samples shall be accompanied by instructions which include shipping authorization and name of carrier and must be received with the bid. If instructions are not received within this time, the commodities shall be disposed of by the University.

19. INSPECTION, ACCEPTANCE AND TITLE: Inspection and acceptance will be at destination unless otherwise provided. Title and risk of loss or damage of all items shall be the responsibility of the contract supplier until accepted by the University, unless loss or damage results from negligence by the University. The contract supplier shall be responsible for filing, processing and collecting all damage claims. However, to assist him in the expeditious handling of damage claims, the University will:

(a) Record any evidence of visible damage on all copies of the delivering carrier's Bill of Lading.

- (b) Report damage (Visible or Concealed) to the carrier and contract supplier confirming such reports in writing within 15 days of delivery, requesting that the carrier inspect the damaged merchandise.
- (c) Retain the item and its shipping container, including inner packing material until inspection is performed by the carrier, and disposition given by the contract supplier.
- (d) Provide the contract supplier with a copy of the carrier's Bill of Lading and damage inspection report.

20. PATENTS, COPYRIGHTS, TRADEMARKS, ROYALTIES and other Intellectual Property: The vendor, without exception, shall indemnify and save harmless the University and its employees from liability of any nature or kind, including cost and expenses for or on account of any copyrighted, patented, or unpatented invention, process, or article manufactured or used in the performance of the contract, including its use by the University of Florida. If the vendor uses any design, device, or materials covered by letters, patent or copyright, it is mutually agreed and understood without exception that the bid prices shall include all royalties or costs arising from the use of such design, device, or materials in any way involved in the work.

21. CONFLICT BETWEEN DOCUMENTS: If any terms and conditions contained within the documents that are a part of this ITB or resulting contract are in conflict with any other terms and conditions contained therein, then the various documents comprising this ITB or resulting contract, as applicable, shall govern in the following order of precedence: change order, purchase order, addenda, special conditions, general conditions, specifications, departmental description of work, and bid.

22. MANUFACTURERS' NAMES AND APPROVED EQUIVALENTS: Any manufacturer's names, trade names, brand names, information and/or catalog numbers listed in a specification are for information and not intended to limit competition. If bids are based on equivalent products, indicate on the bid form the manufacturer's name and number. Vendor shall submit with the bid, cuts, sketches, and descriptive literature, and/or complete specifications. Reference to literature submitted with a previous bid will not satisfy this provision. The vendor shall also explain in detail the reasons why the proposed equivalent will meet the specifications and not be considered an exception thereto. The University of Florida reserves the right to determine acceptance of item(s) as an approved equivalent. Bids which do not comply with these requirements are subject to rejection. Bids lacking any written indication of intent to quote an alternate brand will be received and considered in complete compliance with the specifications as listed on the bid form.

23. NONCONFORMANCE TO CONTRACT CONDITIONS: Items may be tested and/or inspected for compliance with specifications by any appropriate testing facilities. Should the items fail, the University may require the vendor to reimburse the University for costs incurred by the University in connection with the examination or testing. The data derived from any tests for compliance with specifications are public records and open to examination thereto in accordance with Chapter 119, F.S. Items delivered not conforming to specifications may be rejected and returned at vendor's expense. These items and items not delivered as per delivery data in bid and/or purchase order may result in vendor being found in default in which event any and all procurement costs may be charged against the defaulting vendor. Any violation of these conditions may also result in the vendor's name being removed from the University of Florida's vendor file.

24. PUBLIC RECORDS: Any material submitted in response to this Invitation to Bid will become a public document pursuant to Section 119.07 F.S. This includes material which the responding vendor might consider to be confidential or a trade secret. Any claim of confidentiality is waived upon submission, effective after opening pursuant to Section 119.07 F.S.

25. DELIVERY: Unless actual date of delivery is specified (or if specified delivery cannot be met), show number of days required to make delivery after receipt of purchase order in space provided. Delivery time may become a basis for making an award (see Special Conditions). Delivery shall be within the normal working hours of the University of Florida, Monday through Friday, unless otherwise specified.

26. PUBLIC PRINTING - PREFERENCE GIVEN PRINTING WITHIN THE STATE: The University of Florida shall give preference to vendors located within the state when awarding contracts to have materials printed, whenever such printing can be done at no greater expense than, and at a level of quality comparable to, that obtainable from a vendor located outside of the state.

(a) **CONTRACTS NOT TO BE SUBLET:** In accordance with Class B Printing Laws and Regulations "Printing shall be awarded only to printing firms. No contract shall be awarded to any broker, agent, or independent contractor offering printing manufactured by other firms or persons."

(b) **DISQUALIFICATION OF VENDOR:** Reasonable grounds for believing that a vendor is involved in more than one bid for the same work will be cause for rejection of all bids in which such vendors are believed to be involved. Any or all bids will be rejected if there is reason to believe that collusion exists between vendors. Bids in which the prices obviously are unbalanced will be subject to rejection.

(c) **TRADE CUSTOMS:** Current trade customs of the printing industry are recognized unless accepted by Special Conditions or Specifications herein.

(d) **COMMUNICATIONS:** It is expected that all materials and proofs will be picked up and delivered by the printer or his representative, unless otherwise specified. Upon request, materials will be forwarded by registered mail.

(e) **RETURN OF MATERIAL:** All copy, photos, artwork, and other materials supplied by the University of Florida must be handled carefully and returned in good condition upon completion of the job. Such return is a condition of the contract and payment will not be made until return is affected.

END OF SECTION

NOTE: ANY AND ALL SPECIAL CONDITIONS AND SPECIFICATIONS ATTACHED HERETO WHICH VARY FROM THE GENERAL CONDITIONS SHALL HAVE PRECEDENCE.

Bid Number: ITB18KO-131

Title: Building 700 Renovation – Phase 2

Project Number: MP02649



AUTHORIZED REPRESENTATIVES AND CONTACT INFO:

UF PLANNING DESIGN AND CONSTRUCTION

Joe Garcia, AIA, Architect
245 Gale Lemerand Drive
Gainesville, FL 32611-5050
352-273-4009
jagarcia@ufl.edu

UF PROCUREMENT SERVICES

Karen Olitsky
971 Elmore Drive / PO Box 115250
Gainesville, FL 32611-5250
(352) 294-1163
kolitsk@ufl.edu

ARCHITECT

Studio MJG, LLC
Michael Gilfilen
5211 SW 91st Terrace, Suite F
Gainesville, FL 32608
352-226-3213
michael@studiomjg.com

MEP ENGINEER

Campbell Spellicy Engineering, Inc.
Kevin Spellicy
3720 NW 43rd Street, Suite 106
Gainesville, FL 32606
352-372-6987
spellicy@campbellspellicy.com

TABLE OF CONTENTS

I. Bidding Conditions

00020 Invitation to Bid
00100 Instruction to Bidders
00310 Bid Form
00430 List of Subcontractors

II. General Terms and Conditions (CM Design-Bid-Build)

<http://facilities.ufl.edu/forms/contracts/GTC.pdf>

III. Division 0 Non-Technical Specifications

<http://facilities.ufl.edu/forms/contracts/Div0NonTechSpecs.pdf>

IV. Division 1 Non-Technical Specifications

http://facilities.ufl.edu/forms/contracts/Div1_NonTech_Specs_JULY_2017.pdf

V. Forms, Applications, and Illustrations

The following forms or documents can be found on the Planning Design & Construction website at <http://facilities.ufl.edu/forms.html>

- Owner-Contractor Agreement **OR** Agreement for Construction Management Services **OR** Agreement for Design/Build Services
- Application and Certificate for Partial Payment
- Bidding and Award Forms (*for CM and D/B trade packages*)
- Builder Application and Certificate of Partial Payment
- Change Order Form and COP Justification Form
- Utility Outage Request
- UF Project Construction Sign
- Construction Administration and Substantial Completion Guide
- Roads/Sidewalks/Parking Restriction Notification
- Assignment of Antitrust Claims
- Certificate of Non-Segregated Facilities
- Building Permit Application
- Facilities Services Utility Rates
- Waste Reporting Log
- Inspection Requests and Checklists

The following form can be found on Facilities Services website at <https://www.facilitieservices.ufl.edu/departments/utilities/dig-permits/>

- Dig Permit

The following forms or documents can be found on the Environmental Health & Safety website at <http://www.ehs.ufl.edu/programs/buildcode/>

- EH&S Inspection Request Form
- State Fire Marshal Inspection Request Form

VI. Technical Specifications

Division 07 – Thermal and Moisture Protection

079200 Joint Sealants

Division 08 – Openings

081213 Hollow Metal Frames

081416 Flush Wood Doors

087100 Door Hardware

088000 Glazing

Division 09 – Finishes

092216 Non-Structural Metal Framing

092900 Gypsum Board

095123 Acoustical Tile Ceilings

096513 Resilient Base and Accessories

096813 Tile Carpeting

099123 Interior Painting

Division 12 – Furnishings

122413 Roller Window Shades

Division 23 – Mechanical

230005 Mechanical General

230020 Codes and Standards

230030 Mechanical Related Work

230105 Pipes and Pipe Fittings

230110 Valves

230115 Electric Motors

230160 Mechanical Identification

230210 Insulation for HVAC Equipment and Piping

230230 Exterior Insulation for Ductwork

230716 Variable Refrigerant Flow Air Conditioning Systems

230840 HVAC Metal Ductwork

230855 Ductwork Accessories

230860 Grilles, Registers and Ceiling Diffusers

230885 Air Cleaning Equipment

230901 HVAC Controls Pricing

230970 Startup Requirements for HVAC Systems

230985 Testing and Balancing Of Mechanical Systems

Division 26 – Electrical

260005 Electrical General

260020 Codes and Standards

260030 Electrical Related Work

260040 Alterations and Additions to Existing Work

260100 Basic Materials and Methods

260101 Conductor and Cable Identification

260103 General Grounding Electrical Systems

260112 Fuses 600 Volts and Below

260120 Circuit Breaker Enclosures

260125 Circuit Breakers, Molded Case

260155 Relays



- 260170 General Wiring Devices
- 260215 Emergency Lighting, Battery Inverter Units
- 260521 Lighting Fixtures
- 260620 Surge Protection – Secondary
- 260770 Dimming and Control
- 260900 Work Required for Equipment Furnished In
Other Divisions
- 260923 Lighting Control Devices
- 265119 Led Interior Lighting

Division 27 – Communications

- 270712 Telephone, Computer, Television Systems

VII. Drawings

Building 700 Renovation – Phase 2

- G100
- LS111
- A101
- A111
- A112
- A510
- A610
- M001
- M101
- M201
- E001
- E101
- E201
- T101

Field Order #1 – August 18, 2017

- M001
- M101
- M201
- P001
- P101
- E001
- E101
- E201
- E202
- E301
- T101

Field Order #2 – January 19, 2018

- A111
- A610
- A611

Field Order #3 – March 9, 2018

- A111
- A113
- A114

00020 - INVITATION TO BID

The Invitation to Bid shall be in accordance with the University of Florida, Procurement Services "Invitation to Bid Acknowledgement Form" with all relevant information provided therein.

END OF SECTION

00020-1

00100 - INSTRUCTIONS TO BIDDERS

1.1 RELATED SECTIONS

- A. Documents affecting the work of this Section include, but are not necessarily limited to, the General Terms & Conditions and other Sections in Divisions 0 and 1 of these Specifications.

1.2 THE WORK

PROJECT TITLE: **ITB18KO-131, Building 700 Renovation – Phase 2**

1.3 SECURING DOCUMENTS

Copies of the proposed Contract Documents may be obtained from:

University of Florida Procurement Services website.
<https://procurement.ufl.edu/vendors/schedule-of-bids/>

1.4 BID FORM

In order to be considered responsive and responsible, make bids in strict accordance with the following:

- A. Make bids upon the forms provided, properly signed and with all items completed. Do not change the wording of the bid form and do not otherwise alter or add words to the bid form. Unauthorized conditions, limitations, or provisions attached to the bid may be cause for rejection of the bid.
- B. Include with bid a completed and signed Invitation to Bid Construction Acknowledgment Form.
- C. Include completed Section 00310 - Bid Form.
- D. Include list of subcontractors as described in Section 00430 - Subcontractor Listing.
- E. **Bids must be submitted no later than June 12, 2018 at 3:00 PM, local time.** No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.
- F. Address bids to Karen Olitsky, Procurement Agent III, and deliver to:

University of Florida
Procurement Services
971 Elmore Drive / PO Box 115250
Gainesville, FL 32611-5250

Submit bid in a sealed envelope that includes the bid number, contractor name and date and time of the bid opening on the outside of the envelope. Submit one (1) original bid and one (1) electronic copy on flash drive or CD/DVD. It is the sole responsibility of the bidder to see that bids are received on time. Faxed and/or emailed bids will not be accepted.

1.5 PROOF OF COMPETENCY OF BIDDER

A bidder may be required to furnish evidence, satisfactory to the Owner, that the bidder and the bidder's proposed subcontractors have sufficient means and experience in the types of work required to assure completion of the Contract in a satisfactory manner.

1.6 WITHDRAWAL OF BIDS

- A. A bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for opening bids.
- B. No bidder may withdraw his bid for a period of forty-five calendar days after the date set for opening thereof, and bids shall be subject to acceptance by the Owner during this period.

1.7 QUALIFICATION OF BIDDERS

- A. A contract will be awarded only to a responsible bidder, qualified by experience and in a financial position to perform the work specified.
- B. If the bidder has not been pre-qualified with UF Procurement Services within the fiscal year (July 1 through June 30), the bidder may be required to submit the following evidence of eligibility:
 - 1. Evidence that bidder is licensed by the appropriate government agency to perform the work specified.
 - 2. Experience record showing bidder's training and experience in similar work.
 - 3. List a brief description of projects of similar size and/or complexity satisfactorily completed, with location, dates of contracts, names of contracts, and names and addresses of owners.

1.8 SUBCONTRACTS

If the Bidder intends to subcontract any of the Work:

- A. A list of all proposed subcontractors shall be provided with the bid for scopes/packages in excess of \$10,000. See Section 00430 - Subcontractor Listing.
- B. Each subcontractor performing work in excess of \$10,000 must present evidence of being qualified in and licensed for the applicable trade. Such proof of subcontractor licensure shall be provided by the successful bidder after award, but prior to commencement of Work.

1.9 PERFORMANCE AND PAYMENT BONDS

See General Terms & Conditions.

1.10 BID DEPOSIT

Not required.

1.11 AWARD OR REJECTION OF BIDS

The Contract, if awarded, will be awarded to the responsible and responsive bidder who has proposed the lowest Contract Sum, subject to the owner's right to reject any or all bids and to waive informality and irregularity in the bids and in the bidding.

1.12 NON-MANDATORY PRE-BID CONFERENCE:

A non-mandatory Pre-bid Conference will be held prior to the scheduled bid opening for the purpose of considering questions posed by bidders. The conference will be open to interested bidders, prospective subcontractors, and any other interested parties. This conference will be held **May 16, 2018 at 2:00 PM local time in Building 700, 3280 Radio Road, Gainesville, FL 32611.**

1.13 EXECUTION OF AGREEMENT

- A. A Purchase Order (PO) will be issued for purposes of fiscal encumbrance and payment. The PO itself serves as the form of contract.
- B. Upon notice of Bid Award, the bidder to whom the Contract is awarded shall deliver to UF those Certificates of Insurance and Payment & Performance Bonds required by the Contract Documents.
- C. Bonds and Certificates of Insurance shall be approved by UF before the successful bidder may proceed with the Work.

1.14 INTERPRETATION OF CONTRACT DOCUMENTS PRIOR TO BIDDING

- A. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in or omissions from any part of the Contract Documents, s/he may submit a written request for interpretation thereof no later than **May 23, 2018 at 5:00PM**, local time, to Karen Olitsky, Procurement Agent III at kolitsk@ufl.edu. The person submitting the request shall be responsible for its prompt delivery.
- B. Interpretations or corrections of proposed Contract Documents will be made only by Addendum and will be available on the Procurement Services "Schedule of Bids" webpage <https://procurement.ufl.edu/vendors/schedule-of-bids/>. The Owner will not be responsible for any other explanations or interpretations of the proposed Contract Documents.

1.15 TIME OF COMPLETION:

- A. Date of beginning, rate of progress and time for completion of Work for this Project are ESSENTIAL CONDITIONS of Contract. Successful Bidder hereby agrees that Work required by this Contract shall be commenced within ten (10) calendar days after issuance date of written Notice to Proceed; that all insurance and permits will be obtained; that all documents and notices will be filed; that all requirements as specified will be met; and that Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will insure Substantial Completion of entire Project by August 20, 2018, and shall be finally by September 17, 2018.

END OF SECTION

00310 - BID FORMS

BID PROPOSAL

FROM: _____
(Name of Bidder)

TO: UNIVERSITY OF FLORIDA
PROCUREMENT SERVICES
971 Elmore Drive
P.O. Box 115250
Gainesville, Florida 32611-5250

The undersigned, hereinafter called "Bidder", having reviewed the Contract Documents for the Project entitled **ITB18KO-131, Building 700 Renovation – Phase 2** and having visited and thoroughly inspected the site of the proposed Project and familiarized himself/herself with all conditions affecting and governing the construction of said Project, hereby proposes to furnish all labor, materials, equipment and other items, facilities and services for the proper execution and completion of the Project, in strict compliance with the Contract Documents, Addenda, and all other Documents relating thereto on file in Procurement Services, and, if awarded the Contract, to complete the said Work within the time limits called for in the Documents and as stated herein, for the sums as enumerated on this and the following pages:

BASE BID: _____ Dollars

Figures: \$ _____

ADDENDA:

Receipt of the following Addenda to the Construction Documents is acknowledged:

ADDENDUM # _____ Dated _____

ADDENDUM # _____ Dated _____

ADDENDUM # _____ Dated _____

COMPLETION DATE:

All Work covered by the Bidding Documents and the foregoing Base Bid shall be completed and ready for Owner's occupancy as specified in the contract documents.

SIGNATURE:

I hereby certify that for all statements and amounts herein made on behalf of

(Name of Bidder)

a (Corporation) (Partnership) (Individual) organized and existing under the laws of the State of Florida, I have carefully prepared this Bid Proposal from Contract Documents described hereinbefore, I have examined

Contract Documents and local conditions affecting execution of Work before submitting this Bid Proposal, I have full authority to make the statements and commitment herein and submit this Bid Proposal in (its) (their) behalf, and all statements are true and correct.

Signed and sealed this _____ day of _____, 2018.

(Signature of Bidder)

(Print Name)

(Title)

WITNESS:

(Signature of Witness)

(Print Name)

Address: _____

(City) (State) (Zip Code)

END OF SECTION

00430 - SUBCONTRACTOR LISTING

1.1 RELATED SECTIONS

- A. Documents affecting the work of this Section include, but are not necessarily limited to, the General Terms & Conditions and other Sections in Divisions 0 and 1 of these Specifications.

1.2 SUBCONTRACTOR LISTS

- A. Each bidder shall furnish with its bid a list of all subcontractors for subcontracted scopes/packages of work valued at more than \$10,000.
- B. This list shall identify – for each subcontracted package in excess of \$10,000 – the name and address of the proposed subcontractor and the approximate value of the subcontract.
- C. If the bidder does not intend to subcontract portions of the Work in amounts greater than \$10,000, then a statement to that effect shall be furnished with the bid.
- D. See Section 00100 - Instruction to Bidders regarding subcontractor licensure requirements.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples: For each kind and color of joint sealant required.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: One (1) year from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Dow Corning: 791 Silicone Weatherproofing Sealant.

2.3 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material) or Non-Gassing Polyolefin, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
 - 1. Dow Corning, SOF Rod.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.
 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

END OF SECTION

SECTION 08 1213
HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal frames.
- B. Related Requirements:
 - 1. Section 081416 "Flush Wood Doors" for wood doors installed in hollow-metal frames.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include elevations, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Ceco Door or Equal.

2.2 INTERIOR FRAMES

- A. Standard-Duty Frames: SDI A250.8, Level 1. At locations indicated in the Door and Frame Schedule.
 - 1. Materials: 16 Gage Hot-Dipped Galvanized Steel conforming to ASTM A924 and A653
 - 2. Construction: Full profile welded.
 - 3. Exposed Finish: Prime.

2.3 MATERIALS

- A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- B. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- C. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- D. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat.

2.4 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c.
 - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 - 1. Reinforce frames to receive nontemplated, mortised, and surface-mounted hardware.
 - 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.5 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: SDI A250.10.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 - 4. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 - 5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

- c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
- d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.2 ADJUSTING AND CLEANING

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

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Solid-core doors with wood-veneer.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of door.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
1. Dimensions and locations of mortises and holes for hardware.
 2. Dimensions and locations of cutouts.
 3. Undercuts.
 4. Requirements for veneer matching.
 5. Doors to be factory finished and finish requirements.
 6. Fire-protection ratings for fire-rated doors.
- C. Samples: Full line of manufacturer's veneers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Marshfield or equal.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's and WI's "Architectural Woodwork Standards."
- B. WDMA I.S.1-A Performance Grade:
1. Heavy Duty unless otherwise indicated.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

D. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf.
 - b. Screw Withdrawal, Edge: 400 lbf.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade AA faces.
2. Species: Natural Birch
3. Color: Saffron 60-02.
4. Cut: Plain sliced (flat sliced).
5. Match between Veneer Leaves: Pleasing match.
6. Assembly of Veneer Leaves on Door Faces: Center-balance match.
7. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
8. Core: Structural composite lumber.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product in each finish specified.
- C. Door hardware schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Ten years from date of Substantial Completion unless otherwise indicated below:
 - a. Exit Devices: Three years from date of Substantial Completion.
 - b. Manual Closers: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with FBC 2014, The Florida New Accessibility Code 2014 Edition.

2.2 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.
 - 1. Door hardware is scheduled in Part 3.

2.3 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Hager, 4 1/2" x 4 1/2" Stainless Steel Ball-Bearing Hinge or equal. Exterior shall have non-removal pins.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch latchbolt throw.

2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
 3. Deadbolts: Minimum 1-inch bolt throw.
- C. Lock Backset: 2-3/4 inches unless otherwise indicated.
- D. Lock Trim:
1. Description: Corbin Russwin ML2000 Series with NSN Trim
 2. Levers: Cast.
 3. Escutcheons (Roses): Wrought.
 4. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

2.5 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

2.6 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
1. Von Duprin 98 Series with L Trim or equal.

2.7 LOCK CYLINDERS

- A. Lock Cylinders: Shall be ordered by the Project Manager from the UF PPD Keyshop.

2.8 KEYING

- A. Keys: Shall be provided to the user by the UF PPD Keyshop.

2.9 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 instructions 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. All closers shall be supplied with hex nuts and shoulder bolts on labeled wood doors. Mount closers on room side of door. Do not provide hold-open feature.

1. LCN Model 4041 or 1461 or equal.

2.10 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16.

1. Hager or equal.

2.11 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Hager or equal.

- B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
3. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

2.12 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated. Provide no more than 1/2" rise. All exterior thresholds shall be set in a continuous bed of sealant.

1. Pemko, 254X5_FG or equal.

2.13 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Allegion or equal.

2.14 FINISHES

- A. Provide US26D/630 complying with BHMA A156.18.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as directed by Owner.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.2 ADJUSTING

- A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.3 DOOR HARDWARE SCHEDULE

Hardware Group 01:

Door: 120.1

3 ea Hinges

1 ea Lockset - (Office Function)

1 ea Closer

1 ea Floor Stop

Sound Seal

Hardware Group 02:

Doors: 121.1, 122.1, 123.1, 125.1

3 ea Hinges

1 ea Lockset - (Office Function)

1 ea Wall Stop

Frame Silencers

Hardware Group 03:

Door: 124.1

3 ea Hinges

1 ea Lockset - (Office Function)

1 ea Floor Stop

Sound Seal

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Glass for storefront framing.
 - 2. Glazing sealants and accessories.

1.2 COORDINATION

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of

insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. PPG or equal.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the Florida Building Code and ASTM E 1300.
 1. Design Wind Pressures: As indicated on Drawings.
 2. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 1. GANA Publications: Laminated Glazing Reference Manual and "Glazing Manual."
 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."

3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

2.5 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Dow Corning 791, Silicone Weatherproofing Sealant
 2. Applications: Use at all exterior storefront openings.

2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 TAPE GLAZING

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

3.3 GASKET GLAZING (DRY)

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

gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- E. Install gaskets so they protrude past face of glazing stops.

3.4 SEALANT GLAZING (WET)

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

3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

3.6 MONOLITHIC GLASS SCHEDULE

- A. Glass Type GL-1: Clear fully tempered float glass.
 - 1. Minimum Thickness: 1/4".
 - 2. Safety glazing required.

END OF SECTION

SECTION 09 2216
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation reports for firestop tracks.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645.

1. Steel Studs and Runners:
 - a. ClarkDietrich Building Systems or Equal.
 - b. Minimum Base-Metal Thickness: 20 gauge at wall, 14 gauge at head, jamb, and sill.

- C. Slip-Type Head Joints: Where indicated, provide the following:
 1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. ClarkDietrich Building Systems or Equal.

- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. ClarkDietrich Building Systems or Equal.
 2. Minimum Base-Metal Thickness: 20 gauge.

- E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch wide flanges.
 1. ClarkDietrich Building Systems or Equal.
 2. Depth: 1-1/2 inches.
 3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 20 gauge galvanized steel.

- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. ClarkDietrich Building Systems or Equal.
 2. Minimum Base-Metal Thickness: 20 gauge.
 3. Depth: 7/8 inch and 1-1/2 inches as required.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

- B. Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 - 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- E. Direct Furring:
 - 1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- F. Z-Shaped Furring Members:
 - 1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches.
 - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
 - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION

SECTION 09 2900

GYP SUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

2.2 GYP SUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYP SUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Equal to National Gypsum Company.
 - 2. Thickness: 5/8 inch.
 - 3. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet.
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

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

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

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

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use sandable topping compound.
4. Finish Coat: For third coat, use sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.6 AUXILIARY MATERIALS

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

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Equal to USG Corporation.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C 840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4 inch wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 4: at all locations below ceiling.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

H. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION

SECTION 09 5123
ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles for interior ceilings.
 - 2. Fully concealed, direct-hung, suspension systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 ACOUSTICAL TILES

- A. Armstrong or equal.
- B. Acoustical Tile Standard: Manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264.
- C. Classification: Ultima Beveled Tegular, 1894.
- D. Color: White.
- E. Light Reflectance (LR): .90.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- C. Arrange directionally patterned acoustical tiles as indicated on reflected ceiling plans.

END OF SECTION

- F. Ceiling Attenuation Class (CAC): 40.
- G. Noise Reduction Coefficient (NRC): .60.
- H. Fire Resist/Flame Spread: Fire Resistive.
- I. Material: Mineral Fiber, Wet-formed.
- J. Texture: Fine.
- K. Edge/Joint Detail: Beveled Tegral.
- L. Thickness: 3/4 inch.
- M. Modular Size: 24 by 24 inches.

2.2 METAL SUSPENSION SYSTEM

- A. Armstrong or equal.
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, fully concealed, metal suspension system that complies with applicable requirements in ASTM C 635/C 635M.
- C. Grid System: Prelude XL Fire Guard 15/16" Exposed Tee.

2.3 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical tiles in-place during a seismic event.

2.4 METAL EDGE MOLDINGS AND TRIM

- A. Armstrong or equal.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for of suspension-system runners.

SECTION 09 6513
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient base.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 THERMOSET-RUBBER BASE

- A. Johnsonite or equal.
- B. Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Profile: Standard Cove
- F. Lengths: Cut lengths 48 inches long.
- G. Outside Corners: Job formed or preformed.
- H. Inside Corners: Job formed or preformed.
- I. Color: Fudge, 167.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.3 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.
- C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 6813

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture required.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Shaw Contract or equal.
- B. Pattern: Altered 5T128.

- C. Color: Image 26557.
- D. Fiber Type: Eco Solution q nylon.
- E. Stitches per inch: 10.0.
- F. Tufted Weight: 18.00 oz/yd².
- G. Pile Thickness: 0.09 in.
- H. Pile Characteristic: Multi-level Pattern Loop.
- I. Dye Method: 100% Solution Dyed.
- J. Backing: Synthetic.
- K. Size: 9.0" x 36.0".
- L. Install: Herringbone.
- M. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
- N. Performance Characteristics:
 - 1. Radiant Panel Test (ASTM E-648-78): Average results shall exceed 0.22 Watts/cm².
 - 2. Methenamine Pill Test shall have been performed on both carpet surfaces (top pile face and under or backside): Compliance with ASTM D-2859-76.
 - 3. Appearance Retention Rating: Severe traffic, 3.5 minimum according to ASTM D 7330.
 - 4. Electrostatic Propensity: The maximum acceptable static-build when tested in compliance with test standards AATCC-134 shall be maximum 3.5 kilovolts at 70 degree F and 20% relative humidity.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Concrete Slabs:

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive. Carpet adhesives shall be of low odor/solvent content.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.
- I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Sherwin Williams or equal.

- B. Products: Subject to compliance with requirements, provide product listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors:
 - 1. Wall Paint (PT-1): Pure White SW 7005.
 - 2. Wall Paint, Accent Paint (PT-2): Major Blue SW 6795.
 - 3. Door Frame Paint (PT-3): Black Fox SW 7020.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Gypsum Board: 12 percent.
 - 6. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- C. Where a constructor would prefer to utilize a roller on doors, a sample of the finished product shall be submitted for approval, prior to proceeding with the work.
- D. Do not paint door hinges or hardware.
- E. New material surfaces shall be conditioned with metal preparations, and then primes. Primed surfaces are to be sanded prior to finish painting.
- F. Rusty, or corroded metal surfaces shall be sandblasted or wire brushed free of corrosion, then wiped clean with a cloth. Prime and paint with a metal conditioning product that prevents corrosion.

3.4 INTERIOR PAINTING SCHEDULE

- A. Gypsum Board
 - 1. Latex Eggshell Finish- Low Odor, Low VOC
 - a. 1st Coat: PPG Pure Performance Interior Latex Primer 9-900 Series.
 - b. 2nd Coat: PPG Pure Performance Interior Eggshell Latex 9-300 Series.
 - c. 3rd Coat: PPG Pure Performance Interior Eggshell Latex 9-300 Series. (4.0 mils wet, 1.5 mils dry per coat).
- B. Wood: Doors, Trim, Cabinet Work
 - 1. Latex Semi-Gloss Finish- Low Odor, Low VOC

- a. 1st Coat: PPG Pure Performance Interior Latex Primer 9-900 Series.
 - b. 2nd Coat: PPG Pure Performance Interior Semi-Gloss Latex 9-500 Series.
 - c. 3rd Coat: PPG Pure Performance Interior Semi-Gloss Latex 9-500 Series. (4.6 mils wet, 1.7 mils dry per coat).
- C. Metal Galvanized
- 1. Latex Semi-Gloss Finish- Low Odor, Low VOC
 - a. 1st Coat: PPG Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel 90-712 Series. (7.7 mils wet, 3.0 mils dry).
 - b. 2nd Coat: PPG Pure Performance Interior Semi-Gloss Latex 9-500 Series.
 - c. 3rd Coat: PPG Pure Performance Interior Semi-Gloss Latex 9-500 Series. (4.6 mils wet, 1.7 mils dry per coat).

END OF SECTION

SECTION 12 2413
ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Hunter Douglas or Equal.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Chain-Retainer Type: Clip, jamb mount.
 - 2. Spring Lift-Assist Mechanisms: Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Crank-and-Gear Operating Mechanisms: Sealed gearbox drive system controlled by detachable crank handle.
- D. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: Right side of interior face of shade, left side of interior face of shade, as required per opening.
 - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
- E. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- F. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- G. Shadebands:
 - 1. Shadeband Material: Light-filtering fabric, Light-blocking fabric shall be located in the conference room.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- H. Installation Accessories:
 - 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - 2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
 - 3. Endcap Covers: To cover exposed endcaps.

4. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
5. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
6. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
7. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
8. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
 2. Skylight Shades: Provide battens and seams at uniform spacings along shadeband as required to ensure shadeband tracking and alignment through its full range of movement without distortion or sag of material.
 3. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
- B. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- D. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- E. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION

SECTION 230005 / MECHANICAL GENERAL1 GENERAL

- 1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.
- 1.2 Related Documents:
- 1.2.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- 1.2.2 This is a Basic Mechanical Requirements Section. Provisions of this section apply to work of all Division 23 sections.
- 1.2.3 Review all other contract documents to be aware of conditions affecting work herein.
- 1.2.4 Definitions:
- 1.2.4.1 Provide: Furnish and install, complete and ready for intended use.
- 1.2.4.2 Furnish: Supply and deliver to project site, ready for subsequent requirements.
- 1.2.4.3 Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.
- 1.3 Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto.
- 1.4 Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.
- 1.5 Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.
- 1.6 Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

MECHANICAL GENERAL

230005.1

- 1.7 Field Measurements and Coordination:
- 1.7.1 The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.
- 1.7.2 Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.
- 1.7.3 Coordinate work in this division with all other trades in proper sequence to insure that the total work is completed within contract time schedule and with a minimum cutting and patching.
- 1.7.4 Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on mechanical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.
- 1.7.5 Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval. Provide sleeves at all concrete penetrations.
- 1.7.6 Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.
- 1.7.7 Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.
- 1.8 Guarantee:
- 1.8.1 The Contractor shall guarantee labor, materials and equipment for a period of one (1) year from Substantial Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.

MECHANICAL GENERAL

230005.2

- 1.8.2 Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.
- 1.9 Approval Submittals:
- 1.9.1 When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.
- 1.9.1.1 Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.
- 1.9.1.1.1 Submittals shall be properly organized in accordance with the approved submittal control log.
- 1.9.1.1.2 Submittals shall not include items from more than one specification section in the same submittal package.
- 1.9.1.1.3 Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.
- 1.9.1.1.4 Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date.
- 1.9.1.1.5 Submittals that include a series of fixtures or devices (such as HVAC units or valves) shall be organized by the fixture number or valve type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.
- 1.9.1.1.6 The electrical design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this change will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.
- 1.9.2 If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in

MECHANICAL GENERAL

230005.3

order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

- 1.9.3 Review of submittals, product literature, catalog data, or schedules by the Engineer shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.
- 1.9.4 Submit shop drawings and any other drawings specifically called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than ¼" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.
- 1.10 Test Reports and Verification Submittals: Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.
- 1.11 O&M Data Submittals: Submit Operation and Maintenance (O&M) data as called for in other sections. When a copy of approval submittals is included in the O&M Manual, only the final "Approved" or "Approved as Noted" copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein.. Submit manuals at the Substantial Completion inspection.

2 PRODUCTS

- 2.1 All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.
- 2.2 Equipment and Materials:
- 2.2.1 Shall be new and the most suitable grade for the purpose intended. Products installed shall be approved by Engineer and Owner's representative. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.

MECHANICAL GENERAL

230005.4

- 2.2.2 Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.
- 2.2.3 The label of the approving agency, such as UL, IBR, ASME, ARI, AMCA, by which a standard has been established for the particular item shall be in full view.
- 2.2.4 The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.
- 2.2.5 A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.
- 2.2.6 Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.
- 2.2.7 Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.
- 2.2.8 Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.
- 2.3 Requests for Substitution:
- 2.3.1 Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.
- 2.3.2 Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.
- 2.3.2.1 Required product cannot be supplied in time for compliance with Contract time requirements.
- 2.3.2.2 Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

MECHANICAL GENERAL

230005.5

2.3.2.3 Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3.3 All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

Principal of operation.

Materials of construction or finishes.

Thickness of gauge of materials.

Weight of item.

Deleted features or items.

Added features or items.

Changes in other work caused by the substitution.

Performance curves.

If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

3 EXECUTION

3.1 Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2 Coordination:

3.2.1 The Contractor shall be responsible for full coordination of the mechanical systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for piping, ductwork, or other equipment passing through slabs or walls. Contractor shall be responsible for coordination with the Commissioning Agent for submittal review, mechanical installation verification, and functional performance testing.

3.2.2 Any additional steel supports required for the installation of any mechanical equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.

3.2.3 It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.

MECHANICAL GENERAL

230005.6

- 3.2.4 All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.
- 3.2.5 The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.
- 3.2.6 Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
- 3.2.7 Start of work will be construed as acceptance of suitability of work of others.
- 3.3 Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.
- 3.4 Phasing: Provide all required temporary valves, piping, ductwork, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.
- 3.5 Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.
- 3.6 Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.
- 3.7 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 23. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.
- 3.8 Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.
- 3.9 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up

MECHANICAL GENERAL

230005.7

shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

- 3.10 Climate Control: Operate heating and cooling systems as required after initial startup to maintain temperature and humidity conditions to avoid freeze damage and warping or sagging of ceilings and carpet.
- 3.11 Record Drawings:
- 3.11.1 During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.
- 3.11.2 Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.
- 3.12 Acceptance:
- 3.12.1 Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.
- 3.12.2 Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.
- 3.12.3 Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section. Manuals shall contain:
- Detailed operating instructions and instructions for making minor adjustments.
 - Complete wiring and control diagrams, including point-to-point diagrams and addresses.
 - Routine maintenance operations.
 - Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
 - Copies of approved submittals.
 - Copies of all manufacturer's start-up reports and warranties.
 - Copies of test reports and verification submittals.
- 3.12.4 Record Drawings: Submit record drawings.
- 3.12.5 Test and Balance Report: Submit four certified copies. The Report shall be submitted for review prior to the Substantial Completion Inspection unless otherwise required by Division 1.
- 3.12.6 Acceptance will be made on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.

MECHANICAL GENERAL

230005.8

PROJECT NAME
PROJECT NUMBER

ARCHITECT/ENGINEER: Campbell Spellicy Engineering, Inc.

CONTRACTOR: XYZ Construction

Use whatever standard headings you want here

SUBCONTRACTOR: ABC Mechanical Contractor

SUPPLIER: Jones Supply Co.

MANUFACTURER: Various

DATE: 2/15/15

SAMPLE

SECTION: 23545/Hydronic Specialties

1. Vent valves - Hoffman No. 62

List each item separately

2. In-line air separators - Bell & Gossett RL-4

Typical - list mfr name & model number

3. Diaphragm type compression tanks - Bell & Gossett B-200

4. Pump suction diffusers - Bell & Gossett ED-3

CSEI will list all comments on this sheet and will only stamp approvals on this sheet

5. Triple duty valves - Bell & Gossett 3D-4S

6. Shot feeders - J. Woods No. 2

Leave space after each individual item for CENF comments

7. Pressure relief valves - Watts No. 6

8. Pressure reducing valves - Bell & Gossett No. 7

General Contractor's APPROVAL stamp must be on this sheet.

END OF SECTION

MECHANICAL GENERAL

230005.9

SECTION 230020 / CODES AND STANDARDS

1 GENERAL

- 1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.
- 1.2 This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 23 sections.

2 CODES

- 2.1 All work under Division 23 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.
- 2.2 Comply with regulations and codes of utility suppliers.
- 2.3 Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.
- 2.4 Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.
- 2.5 Additional codes or standards applying to a specific part of the work may be included in that section.
- 2.6 The following codes govern the work
 - 2.6.1 Florida Building Code, 2010 with all Supplements.
 - 2.6.2 National Electrical Code (NFPA 70). See Section 26020 for edition.
 - 2.6.3 Installation of Air Conditioning and Ventilation Systems (NFPA 90A), 2009 edition.

3 STANDARDS

All mechanical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

- 3.1 Underwriters' Laboratories (UL)
- 3.2 American National Standards Institution (ANSI)
- 3.3 American Society of Testing Materials (ASTM)

CODES AND STANDARDS

230020.1

- 3.4 National Fire Protection Association (NFPA)
- 3.5 National Electrical Manufacturers Association (NEMA)
- 3.6 Air Conditioning and Refrigeration Institute (ARI)
- 3.7 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
- 3.8 American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
- 3.9 Air Movement and Control Association (AMCA)

END OF SECTION

CODES AND STANDARDS

230020.2

SECTION 230030 / MECHANICAL RELATED WORK1 DIVISION 1 - GENERAL REQUIREMENTS

- 1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- 1.2 This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 23 sections.
- 1.3 Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 23 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

2 DIVISION 5 - METALS

- 2.1 Refer to Division 5, Metals for:
 - 2.1.1 Framing openings for mechanical equipment.
- 2.2 The following is part of Division 23 work.
 - 2.2.1 Supports for mechanical work.

3 DIVISION 6 - WOOD AND PLASTIC

- 3.1 Refer to Division 6, Wood for:
 - 3.1.1 Framing openings for mechanical equipment

4 DIVISION 7 - THERMAL AND MOISTURE PROTECTION

- 4.1 Refer to Division 7, Thermal and Moisture Protection for:
 - 4.1.1 Installation of all roof curbs and roof supports for mechanical work.
 - 4.1.2 Caulking and waterproofing of all wall and roof mounted mechanical work.
 - 4.1.3 Providing all roof curbs and all vent flashing for metal roofs.
- 4.2 The following is part of Division 23 work, complying with the requirements of Division 7.
 - 4.2.1 Fire barrier penetration seals.

5 DIVISION 8 - DOORS AND WINDOWS

- 5.1 Refer to Division 8, Doors & Windows for:
 - 5.1.1 Providing all undercuts

MECHANICAL RELATED WORK

230030.1

6 DIVISION 9 - FINISHES

6.1 Refer to Division 9, Finishes for:

6.1.1 Painting exposed ductwork, piping, and equipment.

6.1.2 Painting structural metal and concrete for mechanical work.

6.1.3 Painting access panels.

6.1.4 Painting color-coded mechanical work indicated for continuous painting. See color schedule in Division 23 section, "Mechanical Identification".

6.1.5 Installation of access doors in gypsum drywall.

6.2 Colors shall be selected by the Architect for all painting of exposed mechanical work in occupied spaces, unless specified herein. Do not paint insulated or jacketed surfaces.

6.3 Perform the following as part of Division 23 work:

6.3.1 Touch up painting of factory finishes.

6.3.2 Painting of all hangers.

7 DIVISION 26 - ELECTRICAL

7.1 Mechanical contractor shall coordinate the exact electrical requirements of all mechanical equipment being provided with the electrical contractor. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

7.2 Mechanical contractor shall provide all HVAC control wiring including the Building Automation system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, complying with the requirements of Division 26. The intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring. All control wiring shall be in conduit unless otherwise noted.

7.3 Electrical contractor shall provide disconnect switches, starters, and contactors for mechanical equipment unless specifically noted as being furnished as part of mechanical

MECHANICAL RELATED WORK

230030.2

equipment.

- 7.4 Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all mechanical equipment, switches, starters, contactors, controllers, and similar equipment.

END OF SECTION

MECHANICAL RELATED WORK

230030.3

SECTION 230105 / PIPES AND PIPE FITTINGS

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to pipes and pipe fittings specified herein.
- 1.3 Extent of pipes and pipe fittings required by this section is indicated on drawings and/or specified in other Division-23 sections.
- 1.4 Codes and Standards:
- 1.4.1 Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and job-site brazing of piping work.
- 1.5 Test Report and Verification Submittals:
- 1.5.1 Submit brazing certification for all brazing installers.

2 PRODUCTS

- 2.1 Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.
- 2.2 Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.
- 2.3 Piping Materials/Products:
- 2.3.1 Soldering Materials: Solders for domestic water service shall be NSF approved or tested to contain no impurities of lead.
- 2.3.2 Pipe Thread Tape: Teflon tape.
- 2.3.3 Protective Coating: Koppers Bitumastic No. 505 or equal.
- 2.3.4 Brazing Materials: B cup with silver content of not less than 5%. ASTM B-32, Grade 96TS. Materials shall be determined by installer to comply with installation requirements.
- 2.4 Copper Tube and Fittings:

PIPES AND PIPE FITTINGS

230105.1

- 2.4.1 Copper Tube: All copper tubing shall be manufactured in the United States.
- 2.4.1.1 Copper Tube: ASTM B88; Type K or L as indicated for each service; hard-drawn temper unless specifically noted as annealed.
- 2.4.1.2 ACR Copper Tube: ASTM B280.
- 2.4.2 Fittings:
 - 2.4.2.1 Wrought-Copper Solder-Joint Fittings: ANSI B16.22.
 - 2.4.2.2 Copper Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.
 - 2.4.2.3 Cast-Copper Flared Tube Fittings: ANSI B16.26.

3 EXECUTION

3.1 Installation

- 3.1.1 General: Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings, not bushings. Align piping accurately at connections, within 1/16" misalignment tolerance.
- 3.1.2 Comply with ANSI B31 Code for Pressure Piping.
- 3.1.3 Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to ½" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation.
- 3.1.4 Concealed Piping: Unless specifically noted as "Exposed" on the drawings, conceal piping from view in finished and occupied spaces, by locating in column enclosures, chases, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.
- 3.1.5 Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical, communications, or data equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

PIPES AND PIPE FITTINGS

230105.2

- 3.1.5.1 Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.
- 3.2 Piping System Joints: Provide joints of the type indicated in each piping system.
 - 3.2.1 Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply non-acid water base type solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Solder pipes using ASTM B828 methods.
 - 3.2.2 Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B.31.
- 3.3 Piping Installation:
 - 3.3.1 Install piping to allow for expansion and contraction.
 - 3.3.2 Isolate all copper tubing from steel and concrete by wrapping the pipe at the contact point, and for one inch on each side, with at least two layers of plastic electrical tape. Isolate all copper tubing installed in block walls with a continuous plastic sleeve.

END OF SECTION

PIPES AND PIPE FITTINGS

230105.3

SECTION 230110 / VALVES

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.
- 1.2 This section is a Division-23 Basic Materials and Methods section, and is part of each Division-23 section making reference to or requiring valves specified herein.
- 1.3 Extent of valves required by this section is indicated on drawings and/or specified in other Division-23 sections.
- 1.4 Quality Assurance:
 - 1.4.1 Valve Dimensions: For face-to-face and end-to-end dimensions of flanged or welding-end valve bodies, comply with ANSI B16.10.
 - 1.4.2 Valve Types: Provide valves of same type by same manufacturer.
 - 1.4.3 Valve Listing: For valves on fire protection piping, provide UL listing.
 - 1.4.4 Valves Installed in Boiler Rooms: Comply with ASME Boiler and Pressure Vessel Code.
- 1.5 Approval Submittals: When required by other Division-23 sections, submit product data, catalog cuts, specifications, and dimensioned drawings for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valves with Division-23 section using the valves, not as a separate submittal. Submit valve comparison chart with applicable valves clearly marked if valves other than basis-of-design are to be used. For each valve, identify systems where the valve is intended for use.
 - 1.5.1 Ball Valves. Type BA.
- 1.6 O&M Data Submittals: Submit a copy of approval submittals. Submit installation instructions, maintenance data and spare parts lists for each type of valve. Include this data in the O&M Manual.

2 PRODUCTS

- 2.1 General: Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by Installer to comply with specifications and installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube, and equipment connections.
- 2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide valves of one of the producers listed for each valve type. The model numbers are listed for

VALVES

230110.1

contractor's convenience only. In the case of a model number discrepancy, the written description shall govern.

2.3 Ball Valves:

2.3.1 General: Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material.

2.3.2 Construction: Ball valves shall be rated for 600 psi. Pressure containing parts shall be constructed of ASTM B-584 alloy 844, or ASTM B-124 alloy 377. Valves shall be furnished with blow-out proof bottom loaded stem constructed of ASTM B-371 alloy 694 or other approved low zinc material. Provide TFE packing, TFE thrust washer, chrome-plated ball and reinforced teflon seats. Valves 1" and smaller shall be full port design. Valves 1¼" and larger shall be conventional port design. Stem extensions shall be furnished for use in insulated piping where insulation exceeds ½" thickness.

2.3.3 Comply with the following standards:

MSS SP-110. Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

2.3.4 Types of Ball (BA) valves:

2.3.4.1 Soldered Ends 2" and Smaller (BA2): Bronze two-piece full port body with adjustable stem packing and stainless steel ball and trim. Nibco S-585-70.

2.3.4.2 Threaded Ends 1" and Smaller (BA3): Bronze two-piece full port body, UL listed (UL 842) for use with flammable liquids and LP gas with lockout rings. Nibco T-585-70-UL. Milwaukee BA400NSF, Apollo 70LF-200, Jomar 175-LWN.

2.4 Valve Features:

2.4.1 General: Provide valves with features indicated and, where not otherwise indicated, provide proper valve features as determined by Installer for installation requirements. Comply with ANSI B31.1

2.4.2 Valve features specified or required shall comply with the following:

2.4.2.1 Solder-Joint: Provide valve ends complying with ANSI B16.18.

2.4.2.2 Trim: Fabricate pressure-containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry unless otherwise specified.

2.4.2.3 Non-Metallic Disc: Provide non-metallic material selected for service indicated in accordance with manufacturer's published literature.

2.4.2.4 Renewable Seat: Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.

VALVES

230110.2

2.4.2.5 Extended Stem: Increase stem length by 2" minimum, to accommodate insulation applied over valve.

3 EXECUTION

3.1 Installation:

3.1.1 General: Install valves where required for proper operation of piping and equipment, including valves in branch lines to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward below horizontal plane.

3.1.2 Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.

3.1.3 Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator.

3.2 Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:

3.2.1 Tube Size 2" and Smaller: Threaded valves. Soldered-joint valves may also be used. (Exception: Do not install solder joint valves with silver solder.)

3.3 Non-Metallic Disc: Limit selection and installation of valves with non-metallic disc to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.

3.4 Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.

END OF SECTION

VALVES

230110.3

SECTION 230115 / ELECTRIC MOTORS

1 GENERAL

- 1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Section apply to work of this Section.
- 1.2 This section is a Division 23 Basic Mechanical Materials and Methods section, and is part of each Division 23 section making reference to motors specified herein.
- 1.3 Extent of motors required by this section is indicated on drawings and/or specified in other Division-23 sections.
- 1.4 Comply with the requirements of Division 26.
- 1.5 UL Compliance: Comply with applicable UL standards pertaining to motors.
- 1.6 Approval Submittals:
 - 1.6.1 Product Data: When required by other Division-23 sections, submit manufacturers standard product data sheets for each type of motor provided. Submit with Division-23 section using the motors, not as a separate submittal. Mark data sheet with arrows indicating product being supplied and list by unique descriptive name all motors to which each data sheet applies. Clearly indicate type, service factor, rpm, duty cycle, voltage, phase, nominal full load efficiency, power factor and insulation class. Field verify and coordinate mounting and frame requirements for matching the drive.
 - 1.7 O&M Data Submittals: Submit a copy of approval submittals. Submit operation and maintenance data for each type of motor. Include these data in O&M Manual. Submit two copies of nameplate data sheet for each motor. One copy shall be included with the O&M Manual and a second copy shall be inserted in a waterproof pouch or bag and attached to the motor. Nameplate data sheets shall be typed or neatly printed and shall include all data on the motor nameplate plus a unique motor description such as "AHU-3 Fan Motor", "Distribution Pump #1" or similar description.

2 PRODUCTS

- 2.1 Acceptable Manufacturers: Subject to compliance with requirements, General Electric, Baldor, US Electric, or approved equal.
- 2.2 General:
 - 2.2.1 Motors shall conform to applicable portions of NEMA Standard MG-1, Motors and Generators.
 - 2.2.2 Motors shall be sized for the application such that when the driven equipment is operated at rated capacity the motor current will not exceed the full-load nameplate current. Service factor shall not be used in normal operation.
- 2.3 Motor Design:

ELECTRIC MOTORS

230115.1

2.3.1 Integral Horsepower Motors:

- 2.3.1.1 Motors shall be open drip-proof or totally enclosed fan cooled as shown on the drawings or listed in the Division 23 section requiring motors.
- 2.3.1.2 Motors shall be three phase, 60 hertz, nominal 1800 rpm, rated at 200 volts for 208 volt systems, 230 volts for 240 volt systems and 460 volts for 480 volt systems. 230/208 volt motors shall not be permitted on 208 volt systems.
- 2.3.1.3 Motors shall be NEMA Design B and shall have 1.15 service factor or greater at 60 hertz.
- 2.3.1.4 Insulation Systems
 - 2.3.1.4.1 In fixed speed applications, motors shall have Class B insulation with 80°C rise over 40°C ambient.
 - 2.3.1.4.2 For variable frequency drive (VFD) applications, motors shall have Class F insulation with 105°C rise over 40°C ambient. Motor manufacturer shall identify motors being used for VFD applications by marking the motor with a stainless steel name-plate "Inverter Duty". Motors shall be provided with one set of thermostatic sensors. Motors to be premium efficiency. Motor nameplate shall be marked "Suitable for Variable Frequency Drive". Motors 3-horsepower or larger utilizing a VFD shall be provided with bearing protection rings to prevent shaft grounding.
- 2.3.1.5 Motor efficiencies shall be based on IEEE-112, Test Method B, as specified in NEMA Standard MG1-12.53. NEMA motor efficiency and power factor shall be clearly shown on the motor nameplate. Inverter duty motors shall have a CIV rating based on NEMA.
- 2.3.1.6 Motors shall be premium efficiency type and shall meet or exceed the following minimum nominal efficiencies at rated voltage.

HORSEPOWER RANGE	MINIMUM NOMINAL EFFICIENCY	MINIMUM ACCEPTABLE POWER FACTOR
1 hp	85.5 pct.	78.0 pct
1.5 hp	86.5 pct.	78.0 pct
2 hp	86.5 pct.	83.0 pct
3 hp	89.5 pct.	80.0 pct
5 hp	89.5 pct.	80.0 pct

2.3.2 Fractional Horsepower Motors one-half hp and above:

- 2.3.2.1 Motors shall be open drip-proof or totally enclosed fan cooled ECM high efficiency type as shown on the drawings or listed in the Division 23 section requiring motors.
- 2.3.2.2 Motors shall be three phase, 60 hertz, nominal 1800 rpm, rated at 200, 230 or 460 volts as shown on the drawings.
- 2.3.2.3 Motors shall be NEMA Design B with class B insulation, unless used with variable frequency drives.

ELECTRIC MOTORS

230115.2

- 2.3.3 Fractional Horsepower Motors less than one-half hp:
- 2.3.3.1 Motors shall be single phase, ECM high efficiency type, 60 hertz, rated at 120 volts with integral thermal protection.
- 2.4 Overload Protection: Properly sized overload protection shall be provided for each motor. This protection shall be an integral part of the motor. Provide three phase protection for all three phase motors. Provide solid state overloads for poly phase motors. Contractors shall set overloads at start-up and be recorded on start up sheets.
- 3 EXECUTION
- 3.1 Motor Size and Location:
- 3.1.1 Size and location of motors shown on the drawings are based on a particular design and may change with a different manufacturer. Submittal of shop drawings or product literature indicating motor sizes or locations different from that designed indicates that Contractor has fully coordinated any required changes to the electrical system with other trades. Approval (if made) is on this basis and no additional cost will be allowed for any changes.
- 3.1.2 Contractor shall verify and make any necessary adjustments to electrical service, branch circuit wiring, branch circuit protection, overload protection, disconnect and controller (starter), or VFD based on actual nameplate data of the motors supplied prior to installation. Where applicable, connect motor winding thermostat to VFD.
- 3.2 Motor Voltages: Contractor shall field verify system voltage prior to ordering or installing any motors. Submittal of shop drawings or product literature indicating motor voltages indicates that Contractor has fully coordinated the motor with the electrical system and that any discrepancies have been resolved. Approval (if made) is on this basis and no additional cost will be allowed for any changes.
- 3.3 Motor Mounting: Adjust motor mounting as required to adjust the drive train for proper belt operation and to accommodate sheave changes or other requirements of the test and balance work.
- 3.4 Motor Nameplate: All motors shall have a nameplate with voltage, phase, full load amps, service rating, serial number, manufacturer's model number, date of manufacture.

END OF SECTION

ELECTRIC MOTORS

230115.3

SECTION 230160 / MECHANICAL IDENTIFICATION

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 This section is a Division-23 Basic Mechanical Materials and Methods section, and is part of each Division-23 section making reference to or requiring identification devices specified herein.
- 1.3 Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other Division-23 sections.
- 1.4 Refer to Division-16 sections for identification requirements of electrical work; not work of this section. Refer to other Division-23 sections for identification requirements for controls; not work of this section.
- 1.5 Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

2 PRODUCTS

- 2.1 General: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division-23 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.
- 2.2 Painted Identification Materials
 - 2.2.1 Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-¼" high letters for ductwork and not less than ¾" high letters for access door signs and similar operational instructions.
 - 2.2.2 Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.
 - 2.2.3 Identification Paint: Standard identification enamel.
- 2.3 Plastic Pipe Markers
 - 2.3.1 Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers.
 - 2.3.1.1 Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with name as shown or specified.

MECHANICAL IDENTIFICATION

230160.1

- 2.3.1.2 Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.
- 2.4 Valve Tags:
- 2.4.1 Brass Valve Tags: Provide 19-gauge polished brass valve tags with stamp-engraved piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" diameter tags, except as otherwise indicated.
- 2.4.2 Plastic Laminate Valve Tags: Provide manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" square black tags with white lettering, except as otherwise indicated.
- 2.5 Engraved Plastic-Laminate Signs:
- 2.5.1 General: Provide engraving stock melamine plastic laminate, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- 2.5.2 Thickness: 1/16" for units up to 20 sq. in. or 8" length; ⅛" for larger units.
- 2.5.3 Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.
- 2.6 Stamped Nameplates: Provide equipment manufacturer's standard stamped nameplates for motors, AHUs, Cus, etc.
- 3 EXECUTION
- 3.1 Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.
- 3.2 Ductwork Identification:
- 3.2.1 General: Identify air supply, return, exhaust, intake and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black or white.
- 3.2.2 Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures, and at 50' spacings along exposed runs.
- 3.2.3 Access Doors: Provide stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.

MECHANICAL IDENTIFICATION

230160.2

- 3.3 Piping System Identification:
- 3.3.1 General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:
- 3.3.1.1 Plastic pipe markers.
- 3.3.1.2 Stenciled markers, black or white for best contrast.
- 3.3.2 Locate pipe markers as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces and exterior non-concealed locations.
- 3.3.2.1 Near each valve and control device.
- 3.3.2.2 Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
- 3.3.2.3 Near locations where pipes pass through walls, ceilings, or enter non-accessible enclosures.
- 3.3.2.4 At access doors, manholes and similar access points which permit view of concealed piping.
- 3.3.2.5 Near major equipment items and other points of origination and termination.
- 3.3.2.6 Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
- 3.3.2.7 On piping above removable acoustical ceilings, except omit intermediately spaced markers.
- 3.4 Valve Identification: Provide coded valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. Coordinate code with operating instructions.
- 3.5 Mechanical Equipment Identification: Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device. Label shall indicate type of system and area served by zone(s) or room numbers. Provide signs for the following general categories of equipment and operational devices:
- 3.5.1 Main control and operating valves, including safety devices.
- 3.5.2 Fans, blowers, primary balancing dampers and VAV boxes.
- 3.5.3 Air conditioning indoor and outdoor units. Label shall indicate the room (fish) number of the major rooms served by the AC unit.

MECHANICAL IDENTIFICATION

230160.3

- 3.5.4 VFDs, transmitters and control boxes.
- 3.5.5 Other items as required.
- 3.6 Stamped Nameplates: Equipment manufacturers to provide standard stamped nameplates on all major equipment items such as motors, pumps, AHUs, etc. Where motors are hidden from view (within equipment casing, or otherwise not easily accessible, etc.), the equipment supplier shall furnish a duplicate motor data nameplate to be affixed to the equipment casing in an easily visible location, unless data is already included on the equipment nameplate.
- 3.7 Ceiling Identifiers: Provide typed label (peel and stick) on ceiling grid below each piece of mechanical equipment concealed above ceilings (branch controller, ac unit, etc) and all main control dampers and piping isolation valves with unit name or equipment description. Provide blue circle dots at grid below all existing and new water shutoff valves to match existing which will be removed when ceilings are demolished.
- 3.8 Adjusting and Cleaning:
 - 3.8.1 Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

END OF SECTION

MECHANICAL IDENTIFICATION

230160.4

SECTION 230210 / INSULATION FOR HVAC EQUIPMENT AND PIPING1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-23 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Approval Submittals:

1.3.1 Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

1.3.1.1 Flexible unicellular piping insulation

1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Armstrong, Schuller, Knauf, Owens Corning, Pittsburgh Corning, U.S. Rubber, or approved equal. All products shall be asbestos-free.

2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics, and adhesive) with a flame-spread rating of 25 or less, and a smoke-developed rating of 50 or less, as tested by ANSI/ASTM E84.

2.3 Pipe Insulation Materials:

2.3.1 Flexible Unicellular Pipe Insulation: ASTM C534, Type I. (Tubular, suitable for use to 200°F.)

2.3.2 Staples, Bands, Wires, and Cement: As recommended by the insulation manufacturer for applications indicated.

2.3.3 Adhesives, Sealers, Protective Finishes: Products recommended by the insulation manufacturer for the application indicated. Marathon Industries "V1-AC Product No. 550" or other products with similar composition are not allowed.

2.3.4 Jackets: ASTM C921, Type I (vapor barrier) for piping below ambient temperature, Type II (vapor permeable) for piping above ambient temperature. Type I may be used for all piping at Installer's option.

3 EXECUTION

INSULATION FOR HVAC EQUIPMENT AND PIPING

230210.1

3.1 General:

- 3.1.1 Install thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves intended purpose.
- 3.1.2 Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.
- 3.1.3 Maintain integrity of vapor-barrier on insulation and protect it to prevent puncture and other damage. Label all insulation "ASBESTOS FREE".
- 3.1.4 Do not apply insulation to surfaces while they are hot or wet.
- 3.1.5 Do not install insulation until systems have been checked and found free of leaks. Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.
- 3.1.6 Do not install insulation on pipe systems until acceptance tests have been completed except for flexible unicellular insulation. Do not install insulation until the building is "dried-in".

3.2 Flexible Unicellular Pipe Insulation:

- 3.2.1 Insulate the following piping systems:
 - 3.2.1.1 Condensate drains from air conditioning units - $\frac{3}{4}$ " thick.
 - 3.2.1.2 Refrigerant piping - $\frac{3}{4}$ " thick.
- 3.2.2 Apply insulation in accordance with the manufacturer's recommendations and instructions. Mitre cut insulation to fit pipe fittings. Use approved cement to seal all joints and ends in the insulation.
- 3.2.3 Insulation outside the building shall be protected by a 0.016" thickness aluminum jacket with aluminum bands on 12" centers.

END OF SECTION

INSULATION FOR HVAC EQUIPMENT AND PIPING

230210.2

SECTION 230230 / EXTERIOR INSULATION FOR DUCTWORK1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.
- 1.3 Approval Submittals:
- 1.3.1 Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:
- 1.3.1.1 Flexible duct insulation
- 1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

- 2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Knauf, Owens-Corning, Schuller, Certainteed.
- 2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, coverings, sealers, mastic, and adhesive) with a flame spread rating of 25 or less, and a smoke-developed rating of 50 or less as tested by ANSI/ASTM 84.
- 2.3 Flexible Fiberglass Insulation: ASTM C553, Type I, Class B-3 (temperature less than 350°F). Duct wrap shall be 1 pcf density R-6 with UL rated aluminum foil vapor barrier (FSK).
- 2.4 Duct Cement (General Purpose Mastic): Duct cement shall be non-hardening, fiber-reinforced and recommended specifically for cementing fittings, components, and longitudinal seams in ductwork insulation. Duct Cement shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Cement shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B. Product shall have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle hardcast	181
Childers	CP-148,181
Ductmate	Fiberseal

EXTERIOR INSULATION FOR DUCTWORK

230230.1

Fosters 95-90

2.5 Duct Sealant (Vapor Barrier Mastic): Duct sealer shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Sealer shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B. Product shall have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle hardcast	102,550
Childers	CP-146,148
Ductmate	Pro Seal
Fosters	32-17, 32-19

2.6 Adhesives: Adhesive shall be water based and designed for adhering insulation to ductwork. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall meet the requirements of NFPA 90-A & 90-B. Product shall have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle hardcast	
Childers	CP-148
Ductmate	
Fosters	85-00,60,62 & 65

2.7 Fiber-Glas Mesh: 10x10 Mesh. Foster Mastafab or equal.

3 EXECUTION

3.1 Insulate all supply, return and outdoor air ductwork concealed above ceilings, in chases, or elsewhere, and the backs of all ceiling supply outlets with 2" thick fiberglass blanket insulation with vapor barrier.

3.2 Installation of Flexible Insulation:

3.2.1 Insulate round elbows and fittings with wrap such that thickness is equal to adjoining duct covering. Clean and dry ductwork prior to insulating.

3.2.2 Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw or by welded cup head pins. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

3.2.3 Lap all joints 2 inches and seal joints with 4-inch wide strips of open mesh glass fabric embedded in two coats of general purpose mastic.

EXTERIOR INSULATION FOR DUCTWORK

230230.2

- 3.2.4 Seal all punctures and breaks in aluminum vapor barrier with open mesh glass fabric and vapor barrier sealant.

END OF SECTION

EXTERIOR INSULATION FOR DUCTWORK

230230.3

SECTION 230716 / VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEMS1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 Basic Mechanical Materials and Methods sections apply to work of this section.
- 1.3 Refer to other sections for testing, adjusting, and balancing of units; not work of this section.
- 1.4 Approval Submittals:
 - 1.4.1 Product Data: Submit manufacturer's technical product data, including dimensions, ratings, electrical characteristics, weight, capacities, materials of construction, and installation instructions. Submit assembly-type drawings showing all piping and electrical connections and all mounting requirements. Show methods of fastening and assembly of components. Provide wiring diagrams.
- 1.5 O&M Data Submittals: Submit manufacturer's maintenance data including parts lists. Include these data, product data, and a copy of approval submittals in O&M manual.

2 PRODUCTS

- 2.1 Quality Assurance:
 - 2.1.1 Test and rate split system air conditioning units in accordance with ARI Standard 210, 240 or 360 as applicable, and provide certified rating seal.
 - 2.1.2 Construct refrigeration system of split system air conditioning units in accordance with ASHRAE 15 (ANSI B 9.1) "Safety Code for Mechanical Refrigeration".
 - 2.1.3 Provide split system air conditioning units with EER/IEER that meets the Florida Energy Conservation Code and the schedule on the drawings.
 - 2.1.4 Provide split system air conditioning units that are designed, manufactured, and tested in accordance with UL or ETL requirements.
 - 2.1.5 Warranty: Provide 5-year parts, 10-year compressor (labor 1st year only - by Manufacturer) warranty.
 - 2.1.6 Acceptable Manufacturers: Submit to compliance with requirements, provide units by Mitsubishi, Daikin, L.G., or approved equal. Systems not per design basis must be designed and calculated by manufacturer to meet heating/cooling capacities and air-flows for each unit/system.
- 2.2 General:

VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEMS

230716.1

- 2.2.1 Casings: Construct of painted mill galvanized steel (or aluminum) formed panels rigidly reinforced and braced. Each unit shall be provided with removable panels to permit the unit (including fans and compressors) to be properly maintained and serviced.
- 2.3 Condensing Unit:
- 2.3.1 Condenser Fans and Drives: Fan shall be of rustproof construction, hot dipped galvanized steel, stainless steel or aluminum. Unit shall have weather protected totally enclosed motor. Provide a close fretwork galvanized steel or non-ferrous fan guard. Motors shall be the permanently lubricated type, resiliently mounted.
- 2.3.2 Condenser Coil: Construct of non-ferrous tubes and aluminum fins. Provide inlet guard to protect condenser fins. Provide salt-spray coating.
- 2.3.3 Compressor: Shall be inverter scroll variable drive design with vibration isolation. Compressor shall not produce objectionable noise or vibration inside the building. Compressors shall have ten (10) year warranty.
- 2.3.4 Service Valves: Provide for high and low pressure readings.
- 2.4 Evaporator Unit:
- 2.4.1 Interior of unit shall be thermally and acoustically insulated with 1 inch fiberglass duct liner insulation. Provide removable panels to permit the unit to be properly serviced and maintained.
- 2.4.2 The evaporator section shall include centrifugal fan, two-speed fan motor, and direct drive. Provide cooling coil, snap out washable filters, refrigerant drier, controls and other necessary devices for a completely automatic unit. Coils shall have copper tubes and aluminum fins. Provide automatic oscillating louver action to facilitate air distribution for cassette and wall-mounted units.
- 2.5 Controls:
- 2.5.1 All safety and operational controls shall be factory wired.
- 2.5.2 Provide microprocessor-based controller and room thermostat (equal to Mitsubishi Simple MA), capable of providing occupancy schedule setbacks, fan speed adjustment, and vane adjustment as applicable. Setpoint dead band shall be reset from the factory default to be 2.8°F.
- 2.5.3 All ducted indoor units shall have unit controller capable of providing the VRF sequencing as well as additional contacts for reading zone CO2 sensor as an input and controlling 2-position outside air damper position as an output. Controller shall open damper to maximum airflow if CO2 level is above 1200 ppm and retain that position until CO2 level falls below 800 ppm. If CO2 level is below 800 ppm, damper shall remain closed to minimum airflow position.
- 2.5.4 Provide central building level controller (equal to Mitsubishi AE-200) for on-site

VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEMS

230716.2

- monitoring and adjustment of all VRF equipment. Central controller shall be located in the new TR room.
- 2.5.5 Provide BacNet interface gateway from the VRF central controller for integration to the Owner's existing BAS.
- 2.6 Refrigerant Piping:
- 2.6.1 Copper tubing 3/4" and smaller: Type ACR, soft annealed temper; cast copper-alloy fittings for flared copper tubes; flared joints.
- 2.6.2 Brazing material: Silver solder bearing at least 15% silver; Sil Fos.
- 2.6.3 Hangers: Provide steel hangers lined with PVC for protection of piping insulation. Provide hangers with spacing as appropriate for each pipe size and material.
- 2.7 Supports: Provide hurricane tie-down kits for outside units.

3 EXECUTION

- 3.1 Installation: Install in accordance with producer's printed instructions. System shall be installed by properly-trained mechanical contractor having variable refrigerant flow system manufacturer's certification. Certification of installing mechanical contractor shall be acquired by attending and completing manufacturer's service training course for a minimum of three days at the manufacturer's training facility. Manufacturer's training facility shall be equipped with fully functioning variable refrigerant flow equipment, including outdoor units, indoor units, branch controllers, controls and any other pertinent devices, necessary to provide the installing contractor with hands-on training of said equipment, controls, etc. After attending and completing the the three-day service training course, and if deemed appropriate by course instructor, manufacturer shall issue certification of attending mechanical contractor. Note: As certification shall be issued by name to the attending mechanical contractor personnel, the project design mechanical consulting engineer shall reserve the right to be provided with proof of certification of installing mechanical contractor's personnel. This is to verify that installing mechanical contractor has maintained the employ of at least one (1) certified installer.
- 3.2 Support: Anchor units to curbs with cadmium-plated self-tapping screws, lag screws, or bolts, as directed by slab construction. Secure outdoor unit to withstand FBC wind velocity.
- 3.3 Refrigerant Piping: Comply with ANSI B31.5, "Refrigerant Piping," (extend lower pressure limits below 15 psig), and ASHRAE 15 (ANSI B9.1). Make all joints carefully and neatly. Clean pipe and fittings before fluxing. Remove burrs. Braze by the sweat method using Sil Fos. Manufacturer shall provide installing mechanical contractor with computer-generated refrigerant piping diagram (ie: Mitsubishi Design Tool), including line sizes, associated fittings and refrigerant charge. Prior to fabrication, contractor shall provide shop drawings (field coordinated with existing conditions) to reflect the exact piping routing and lengths. Any revisions in pipe equivalent length shall be re-modeled using the manufacturer's design tool to provide revised capacities and required

VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEMS

230716.3

- refrigerant charge. The updated refrigerant piping diagram shall be used for all piping fabrication and charge. All piping shall be updated on the as-built set to be as accurate to field conditions as possible. Provide shutoff service valves for each branch.
- 3.4 Pipe sections shall be preinsulated and capped at ends prior to installation. Once installed/hung, sections and/or fittings can be uncapped and connected after nitrogen purging.
- 3.5 No piping work shall be performed concurrent with any dust-producing work such as ceiling or drywall work.
- 3.6 Testing: Refrigeration piping shall not be accepted unless it is gas tight.
- 3.6.1 Nitrogen Gas Pressurization: Pressure test to 600 psi using dry nitrogen gas, allowing to stand for a minimum of 24 hours. If the pressure drops, perform bubble test as follows: After pressurization as described, spray the flare connection parts, brazed parts, flanges, and other parts that may leak with a bubbling agent (Kyuboflex, etc.) and visually check for bubbles. After the airtight test, wipe off bubbling agent.
- 3.7 Evacuation: After completing the successful pressure test, multiple-evacuate the system. Leave the compressor isolation valves shut and connect the vacuum pump to both the high and low sides. Evacuate the system to an absolute pressure of 1,500 microns. Then break vacuum to 2 psig with dry nitrogen. Repeat this process. Install the proper biflow drier in the liquid line and evacuate the system to 500 microns. Leave vacuum pump running for at least two hours without interruption. Break vacuum with the refrigerant to be used and raise pressure to 2 psig. Do not operate compressors during the evacuation procedure.
- 3.8 Charging: After completing the successful evacuation procedure, charge refrigerant directly to the system from the original containers through a filter drier. Charge to the manufacturer's stated conditions of pressure for required temperature. Weigh the refrigerant added and record on the startup report.
- 3.9 Insulation: Insulate refrigerant suction and liquid lines with 1" flexible unicellular with aluminum jacket. Provide 1" flexible unicellular insulation (field applied) for all branch controllers, valves, and piping connections. The manufacturer-provided insulation kit shall not be used for these locations.
- 3.10 Cleaning: Clean tar and all other soil from housing exterior. Leave ready for Division 7, Caulking Work. Caulk around pipe sleeves.
- 3.11 Condensate Drain: Pipe trapped copper condensate drain to outside the building or to a point of disposal as shown on the drawings. Pipe shall be full size of unit outlet. Refer to section "Insulation" for pipe insulation.
- 3.12 Startup: Check entire assembly for correctness of installation, alignment, and control sequencing. Start all component parts in proper sequence. Make all adjustments required to insure proper smooth quiet operation.

END OF SECTION

VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEMS

230716.4

SECTION 230840 / HVAC METAL DUCTWORK1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 Division-23 Basic Mechanical Materials and Methods Sections apply to work of this section.
- 1.3 Extent of HVAC metal ductwork is indicated on drawings and in schedules, and by requirements of this section.
- 1.4 Refer to other Division-23 sections for exterior insulation of metal ductwork.
- 1.5 Refer to other Division-23 sections for ductwork accessories.
- 1.6 Codes and Standards:
 - 1.6.1 SMACNA Standards: Comply with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible" 1985 Edition for fabrication and installation of metal ductwork, unless otherwise noted.
 - 1.6.2 NFPA 90A Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".
- 1.7 Approval Submittals:
 - 1.7.1 Product Data: Submit manufacturer's technical product data and installation instructions for the following.
 - 1.7.1.1 Factory-fabricated ductwork
 - 1.7.1.2 Sealants
 - 1.7.1.3 Flexible duct
 - 1.7.2 Shop Drawings: Submit scaled layout drawings of HVAC metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between ductwork and proximate equipment. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

2 PRODUCTS2.1 Ductwork Materials:

- 2.1.1 Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including

HVAC METAL DUCTWORK

230840.1

pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.

2.1.2 Galvanized Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations. Stamp gauge and manufacturer's identification on each sheet. Break sheets so that identification is exposed.

2.2 Miscellaneous Ductwork Materials:

2.2.1 General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

2.2.2 Duct Sealant (Vapor Barrier Mastic): Duct sealer shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Sealer shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B. Product shall be listed suitable for LEED projects and have less than 80 grams/liter volatile organic compounds (VOC). Insulation Contractor shall select product for specific application.

Carlisle hardcast	102,550
Childers	CP-146,148
Ductmate	Pro Seal
Fosters	32-17, 32-19

2.2.3 Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

2.2.4 Flexible Ducts: Provide CPE inner liner with galvanized steel helix with factory applied 2" thick external insulation (R-6) and vapor barrier. Provide fire retardant reinforced metalized polyester jacket, complying with UL 181. Provide conical fittings with damper and without scoop for all flexible duct take offs. Provide 1" standoff for damper. Use flexible ducts only where shown on the drawings. Flexmaster 8MR6 or Thermaflex MKF R-6, ATCO 36, Gemflex SR-6A.

2.2.5 Connections:

2.2.5.1 Return air grille connections shall be straight sided with damper and one inch high insulation standoff equipment to Crown 724-D5 or Flexmaster FLD-BO.

2.2.5.2 Exhaust air grille connections shall be straight sided with damper equal to Crown 724 or Flexmaster FLD.

2.2.5.3 Where duct height does not permit the use of conical spin-in fittings, use low profile side take-off fittings equal to Crown 3300-DS or Flexmaster STOD-BO.

HVAC METAL DUCTWORK

230840.2

- 2.2.6 Spin-In and Side Take-Off Fittings: Provide round branch run-outs as follows.
- 2.2.6.1 Supply air diffuser connections shall be conical with damper and one inch high insulation stand-off equal to Crown 3200 DS or Flexmaster CBD-BO.
- 2.2.6.2 Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15° change of direction per section. Unless specifically detailed otherwise, use 45° laterals and 45° elbows for branch takeoff connections. Where 90° branches are indicated, provide conical type tees.
- 2.3 Fabrication:
- 2.3.1 Shop fabricate ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.
- 2.3.2 Shop fabricate ductwork of gauges and reinforcement complying with SMACNA "HVAC Duct Construction Standards". Duct downstream of terminal units, supply duct from air conditioning units and all return and exhaust duct shall be minimum 2" pressure class unless otherwise noted.
- 2.3.3 Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1½ times associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.
- 2.3.4 Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division-23 section "Ductwork Accessories" for accessory requirements.
- 2.4 Factory-Fabricated Low Pressure Ductwork (Maximum 2" W.G.):
- 2.4.1 Material: Galvanized sheet steel complying with ASTM A 527, lockforming quality, with ASTM A 525, G90 zinc coating, mill phosphatized.
- 2.4.2 Gauge: 28-gauge minimum for round ducts and fittings, 4" through 8" diameter. 26-gauge minimum 9" through 14", 24-gauge minimum 15" through 26".
- 2.4.3 Elbows: One piece construction for 90° and 45° elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint. Provide turning vanes in all elbows.
- 2.4.4 Divided Flow Fittings: 90° tees, constructed with saddle tap spot welded and bonded to duct fitting body.
- 2.4.5 Acceptable Manufacturers: Subject to compliance with requirements, provide factory-

HVAC METAL DUCTWORK

230840.3

fabricated ductwork by Semco Mfg., Inc. or United Sheet Metal Div., United McGill Corp, or approved equal.

3 EXECUTION

3.1 General: Examine areas and conditions under which HVAC metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Installation Of Metal Ductwork:

3.2.1 General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor. Seal all duct joints and seams with sealant.

3.2.2 Supports: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work. Install self-drilling screw anchors in prestressed concrete or existing work.

3.2.3 Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements. Seal joints in round or oval ductwork with hard cast or shrink bands, and sheet metal screws, or by welding.

3.2.4 Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally. Avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. In finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings, unless specifically noted as "Exposed". Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

3.2.5 Electrical Equipment Spaces: Do not route ductwork through transformer vaults or other electrical equipment spaces and enclosures.

3.2.6 Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on 4 sides by at least 1 1/2". Fasten to duct and substrate. Where ducts pass through fire-rated floors, walls, or partitions, provide firestopping between duct and substrate.

HVAC METAL DUCTWORK

230840.4

- 3.2.7 Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- 3.2.8 Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards. Fan discharge outlet ducts shall be installed correctly with regard to "system effect" per AMCA Publication 201.
- 3.3 Installation of Flexible Ducts:
- 3.3.1 Maximum Length: For any duct run using flexible ductwork, do not exceed 6'-0" extended length. Flexible duct shall only be allowed as detailed on the drawings.
- 3.3.2 Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible". Support flexible ducts to eliminate pinching and kinking which would restrict flow with cloth or plastic hanging straps at least 1½" wide spaced not more than 5 feet apart.
- 3.3.3 Seal inside of flexible duct connections to sheet metal ducts, boots and terminals. Additionally secure connection with strap clamp. Provide outer coat of sealant and insulate joint with foamed rubber insulation to avoid condensation.
- 3.4 Leakage Tests: After each duct system is completed, test for duct leakage in accordance with Sections 3 and 5 of the SMACNA HVAC Air Duct Leakage Test Manual. Repair leaks and repeat tests until total leakage is less than 3% of system design air flow for low pressure systems and less than 1% for systems rated over 3".
- 3.5 Equipment Connections: Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.
- 3.6 Clean ductwork internally free of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Keep ducts closed with poly during construction to prevent contamination by construction dust and debris.
- 3.7 Balancing: Refer to Division-23 section "Testing, Adjusting, and Balancing" for air distribution balancing of metal ductwork; not work of this section. Seal any leaks in ductwork that become apparent in balancing process.
- 3.8 System Adjustment: Adjust the system to provide functional operation to the extent possible, and leave ready for Testing and Balancing work. It is not the intent of this section to provide final testing and balancing, but to leave the system operational with a minimum of noise.

END OF SECTION

HVAC METAL DUCTWORK

230840.5

SECTION 230855 / DUCTWORK ACCESSORIES

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
 - 1.2 Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.
 - 1.3 Extent of ductwork accessories work is indicated on drawings and in schedules, and by requirements of this section.
 - 1.4 Refer to other Division-23 sections for testing, adjusting, and balancing of ductwork accessories; not work of this section.
 - 1.5 Codes and Standards:
 - 1.5.1 SMACNA Compliance: Comply with applicable portions of both SMACNA "HVAC Duct Construction Standards, Metal and Flexible" and "Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems".
 - 1.5.2 UL Compliance: Construct, test, and label fire dampers in accordance with UL Standard 555 "Fire Dampers and Ceiling Dampers". Construct, test and label smoke dampers in accordance with UL Standard 555S "Leakage Rated Dampers for use in Smoke Control Systems."
 - 1.5.3 NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.
 - 1.6 Approval Submittals:
 - 1.6.1 Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction; and installation instructions as follows:
 - 1.6.1.1 Low pressure manual dampers
 - 1.6.1.2 Control dampers
 - 1.6.1.3 Flexible connections
- ### 2 PRODUCTS
- 2.1 Dampers:
 - 2.1.1 Low Pressure Manual Dampers: Provide 16 gauge dampers of single-blade type (12" maximum blade width) or multiblade type. Damper blades to be gang-operated from a single shaft with nylon or ball bearings on each end. Provide indexed locking quadrant.

DUCTWORK ACCESSORIES

230855.1

Parallel or opposed blade style is acceptable. Provide 2" standoff on locking quadrant for externally insulated duct. Final damper settings shall be marked in indelible ink or paint.

- 2.1.2 Control Dampers: Provide dampers with parallel blades for 2-position control or opposed blades for modulating control. Construct blades of 16-ga. steel. Provide heavy-duty molded self-lubricating nylon bearings and 1/2" diameter steel axles spaced on 9" centers. Provide sponge rubber or felt blade edges. Construct frame of 2" x 1/2" x 1/8" steel channel for face areas 25 sq. ft. and under; 4" x 1-1/4" x 16-ga. channel for face areas over 25 sq. ft. Provide galvanized steel finish with aluminum touch-up. Actuators (motors) are provided by control contractor. Damper operators shall have travel stops for making fixed settings for test and balance and final settings shall be marked in indelible ink or paint.
- 2.1.3 Acceptable Manufacturers: Subject to compliance with requirements, provide dampers by Greenheck, American Warming & Ventilating, Arrow Louver and Damper, Penn Ventilator Co., or Ruskin Mfg. Co.
- 2.2 Turning Vanes: Provide manufactured or fabricated single wall turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".
- 2.3 Flexible Connections:
- 2.3.1 General: Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.
- 2.3.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following: Duro Dyne Corp., Flexaust (The) Co., or Ventfabrics, Inc.

3 EXECUTION

- 3.1 Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- 3.2 Installation of Ductwork Accessories:
- 3.2.1 Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.
- 3.2.2 Install balancing dampers at all main ducts adjacent to units in return air, outside air and where indicated.
- 3.2.3 Install control dampers in the outside air duct for each zone. Damper operator provided

DUCTWORK ACCESSORIES

230855.2

- by control contractor.
- 3.2.4 Install turning vanes in square or rectangular 90° elbows in supply, return, and exhaust air systems, and elsewhere as indicated.
- 3.2.5 Install flexible connections in ductwork such that the clear length of the connector is approximately two inches. Provide thrust restraints as required. Flexible material shall not be so slack as to take a definite concave or convex shape during fan operation.
- 3.2.6 Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.
- 3.3 Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.
- 3.4 Adjusting and Cleaning:
- 3.4.1 Adjusting: Adjust ductwork accessories for proper settings.
- 3.4.2 Final positioning of manual dampers is specified in Division-23 section "Testing, Adjusting, and Balancing". However, the system shall be left functional with all dampers open or throttled.
- 3.4.3 Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

DUCTWORK ACCESSORIES

230855.3

SECTION 230860 / GRILLES, REGISTERS AND CEILING DIFFUSERS

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.
- 1.3 Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.
- 1.4 Refer to other Division-23 sections for ductwork and duct accessories required in conjunction with air outlets and inlets and for balancing of air outlets and inlets; not work of this section.
- 1.5 Codes and Standards:
 - 1.5.1 ADC Compliance: Test and rate air outlets and inlets in certified laboratories under requirements of ADC 1062 "Certification, Rating and Test Manual". Provide air outlets and inlets bearing ADC Certified Rating Seal.
 - 1.5.2 NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".
- 1.6 Approval Submittals:
 - 1.6.1 Product Data: Submit manufacturer's technical product data for air outlets and inlets indicating construction, finish, and mounting details.
 - 1.6.2 Performance Data: For each type of air outlet and inlet furnished, provide aspiration ability, temperature and velocity traverses, throw and drop, and noise criteria ratings. Indicate selections and data as required.
- 1.7 O&M Data Submittals: Submit cleaning instructions for finishes and spare parts lists. Include this data and a copy of approval submittals in O&M manual.

2 PRODUCTS

- 2.1 General:
 - 2.1.1 Except as otherwise indicated, provide manufacturer's standard grilles, registers, and ceiling diffusers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.
 - 2.1.2 Manufacturers not listed in the following specification will not be considered for approval unless accepted by addendum prior to bid.

GRILLES, REGISTERS AND CEILING DIFFUSERS

230860.1

- 2.1.3 Performance: Provide grilles, registers and ceiling diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device equal to the basis of design.
- 2.1.4 Ceiling and Wall Compatibility: Provide grilles, registers and diffusers with border styles that are compatible with adjacent wall and ceiling systems, and that are specifically manufactured to fit into ceiling module or wall with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems and walls which will contain each type of ceiling diffuser, grille, or register. All ceiling and wall-mounted grilles, registers and diffusers shall be provided with gaskets to seal them with the building envelope.
- 2.1.5 Appearance: All grilles and registers shall be aluminum construction and all diffusers shall be aluminum construction, unless otherwise noted, with uniform matching appearance for each type of outlet. Ceiling mounted grilles and registers shall be set to be sight tight from the predominant exposure.
- 2.1.6 Finish: All ceiling mounted grilles, registers, and diffusers shall be finished with baked white enamel. Wall and door mounted grilles and registers shall be finished with baked white enamel.
- 2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products by Titus, Price, or Metal Aire.
- 2.3 Square Plaque Ceiling Diffusers (CD): Provide square face, adjustable, 360 degree pattern diffusers with one-piece stamped cones, no corner joints, round necks. Inner plaque assembly shall be fully removable. Provide lay-in panel as required. Provide trim ring for diffusers in hard ceilings to allow opening to be used for access. Provide square to round duct boot adaptors for ceiling-mounted air devices. Price Model SPD or equal.
- 2.4 Return Grilles (RG): Provide return grilles registers with one set of 45 degree fixed louvers, parallel to the long dimension. Titus 350 FL or Metalaire RHE. Provide square to round duct boot adaptors for ceiling-mounted air devices.
- 2.5 Exhaust Grilles (EG): Provide exhaust grilles with one set of 45 degree fixed louvers, parallel to the long dimension. Provide mounting frame for all wall and plaster ceiling installations. Titus 350 FL or Metalaire RHE.
- 2.6 Transfer Grilles (TG): Provide transfer grilles with one set of 45 degree fixed louvers, parallel to the long dimension. Titus 350 FL or Metalaire RHE.

3 EXECUTION

- 3.1 Coordinate installation with ceiling and light fixture installation. Locate ceiling outlets as indicated on architectural Reflected Ceiling Plans. Unless otherwise indicated, locate ceiling outlets in the center of acoustical ceiling modules with sides parallel to the grid.
- 3.2 Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended

GRILLES, REGISTERS AND CEILING DIFFUSERS

230860.2

- functions.
- 3.3 Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.
 - 3.4 Set air volumes to values shown on the drawings so that the system is functional. Leave ready for test and balance contractor.
 - 3.5 Furnish to Owner three operating keys for each type of outlet and inlet that require them; obtain receipt.

END OF SECTION

GRILLES, REGISTERS AND CEILING DIFFUSERS

230860.3

SECTION 230885 / AIR CLEANING EQUIPMENT1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.
- 1.3 Extent of air cleaning work required by this section is indicated on drawings and schedules, and by requirements of this section.
- 1.4 Refer to Division-23 air handling units section for filter boxes associated with air handling units; not work of this section.
- 1.5 Refer to Division-23 duct accessories section for duct access door work required in conjunction with air filters; not work of this section.
- 1.6 Control wiring specified as work of Division 23 for Automatic Temperature Controls is work of that section.
- 1.7 Codes and Standards:
- 1.7.1 NFPA Compliance: Comply with applicable portions of NFPA 90A pertaining to installation of air filters.
- 1.7.2 UL Compliance: Comply with UL Standards pertaining to safety and performance of air filter units.
- 1.7.3 ASHRAE Compliance: Comply with provisions of ASHRAE Standard 52 for method of testing, and for recording and calculating air flow rates.
- 1.8 Approval Submittals:
- 1.8.1 Product Data: Submit manufacturer's technical product data including dimensions, weights, required clearances and access, flow capacity including initial and final pressure drop at rated air flow, efficiency and test method, fire classification, and installation instructions.
- 1.8.1.1 Replaceable panel filters (throwaway)
- 1.8.1.2 Extended surface panel filters (prefilters)
- 1.8.2 Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, materials, and methods of assembly of components.
- 1.8.2.1 Ultraviolet light coil cleaner.

AIR CLEANING EQUIPMENT

230885.1

1.9 O&M Data Submittals:

- 1.9.1 Maintenance Data: Submit maintenance data and spare parts lists for each type of filter and rack required. Include this data, product data and a copy of approval submittals in O&M manual.

2 PRODUCTS

- 2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide air cleaning equipment of one of the following: American Air Filter Co., Continental Air Filter Co., Cambridge Filter Corp., Farr Co., or approved equal.

- 2.2 Provide cabinet and framing suitable for equipment being installed. Cabinet shall be shipped in one piece but allow installation through a standard 3' door. Knock-down and reassembly is required.

- 2.3 Replaceable Panel Filters (Filter Grilles): Provide factory-fabricated, viscous-coated, flat panel type replaceable air filters with holding frames; as indicated, in sizes indicated, with 2" thick UL Class 2 throwaway media material; construct media of interlaced glass fibers, spray with non-flammable adhesive, frame in throwaway fiberboard casings, and sandwich between perforated metal grilles. Provide filters with rated face velocity of 500 fpm, initial resistance of not greater than 0.20" w.g., final rated resistance of 0.50" w.g., and average arrestance of 80%. Basis of design: American Air Filter 5700.

- 2.4 Extended Surface Panel Filters (OA Filters): Provide factory fabricated pleated, dry flat panel; replaceable air filters of sizes indicated, with 2" thick UL Class 2 material. The media shall be bonded to the fiberboard casings to prevent leakage. Provide filters with rated face velocity of 500 fpm, initial resistance of not greater than 0.30" w.g., final rated resistance of 1.0" w.g., average arrestance of 90%, and average dust spot efficiency of 60%. Basis of design: MERV-13.

3 EXECUTION

- 3.1 General: Comply with installation requirements as specified elsewhere in these specifications pertaining to air filters housing/casings, and associated supporting devices.

- 3.2 Install air filters and holding devices of types indicated, and where shown; in accordance with air filter manufacturer's written instructions and with recognized industry practices; to ensure that filters comply with requirements and serve intended purposes.

- 3.3 Locate each filter unit accurately in position indicated, in relation to other work. Position unit with sufficient clearances for normal service and maintenance. Anchor filter holding frames securely to substrate.

- 3.4 Coordinate with other work including ductwork and air handling unit work as necessary to interface installation of filters properly with other work.

- 3.5 Install filters in proper position to prevent passage of unfiltered air.

AIR CLEANING EQUIPMENT

230885.2

- 3.6 Install air filter gauge pressure taps upstream and downstream of filters to indicate air pressure drop through air filter. Mount filter gauges on outside of filter housing or filter plenum, in accessible position. Adjust and level included gauges for proper readings.
- 3.7 Install Cosatron system as shown on the drawings and in accordance with manufacturer's printed instructions.
- 3.8 Install self-contained filter modules accordance with manufacturer's printed instructions.
- 3.9 Construction Filters: No systems that include filters shall be operated at any time unless the complete specified prefilters and final filters are installed. Maintain all filters during construction. Install clean prefilters and final filters just prior to test and balance work.
- 3.10 Extra Filters: Provide a complete spare set of filters for OA units. Filter grille filters will be supplied by Owner's vendor following construction. Obtain receipt from Owner that spare filters have been received.

END OF SECTION

AIR CLEANING EQUIPMENT

230885.3

SECTION 230901 / HVAC CONTROLS PRICING

1. GENERAL

1.1 Refer to other Division 23 and Division 26 section and drawings for requirements concerning HVAC controls.

1.2 The only acceptable Controls System Subcontractor for the HVAC controls shall be Johnson Controls, Inc. All work including controls, shall be included by the Contractor in the Base Bid for this Project. The Contractor shall be responsible for verifying the Scope of Work for the Control System, which is to be provided by Johnson Controls, Inc. All control work, devices, and programing shall comply with the UF Standards. The Scope of Work for Johnson Controls, Inc. is as follows:

1.2.1 Included in the Scope of Work:

1.2.1.1 Programing and graphics updates for the three additional VRF indoor units.

1.2.1.2 Control wiring and control tubing. Power wiring to control panel.

1.2.1.3 1-year Warranty, 4 hours of Owner training, submittals, tax and freight.

1.2.2 Not Included in the Scope of Work:

1.2.2.1 Payment of performance bond.

1.2.2.2 Installation of valves, dampers or other in-line devices.

1.2.2.3 Permits.

1.2.2.4 Dampers of any kind.

1.2.2.5 Starters, disconnects, variable speed drives or their installation.

1.2.2.6 Access doors and/or panels.

1.2.2.7 Johnson Controls, Inc. Open book price for HVAC controls is _____. This price shall be included by the Contractor in the Base Bid of this Project.

END SECTION

HVAC CONTROLS PRICING

230901.1

SECTION 230970 / START-UP REQUIREMENTS FOR HEATING, VENTILATING, & AIR CONDITIONING (HVAC) SYSTEMS1 GENERAL

1.1 Intent: It is the intent of this section to require that the startup requirements and report noted herein be performed prior to starting TAB work on each system. Work can be phased with permission of the Engineer.

1.2 Coordination:

1.2.1 The Contractor shall furnish to the TAB Contractor a complete set of plans, specifications, addenda, shop drawings, equipment performance data sheets, change orders, etc. as requested by the TAB Contractor.

1.2.2 The Contractor shall participate in a TAB coordination meeting to discuss interface requirements with the TAB Contractor and to establish a schedule for TAB work prior to start of TAB work.

2 PRODUCTS: None3 EXECUTION:

3.1 The TAB work shall not commence until the Engineer has received written notice from the Contractor that HVAC systems are 100% complete and are fully operational. Submit Startup Report as described herein.

3.2 The Contractor shall place all HVAC systems and equipment into complete operation during each working day of TAB work.

3.3 The Contractor shall provide access to HVAC systems and equipment by supplying ladders and/or scaffolding, and opening access panels and equipment room doors.

3.4 The TAB Contractor will provide to the Contractor TAB punch lists of non-complying HVAC work as they are discovered. The Contractor shall replace or repair non-complying work as soon as possible in order not to delay completion of TAB work.

3.5 If the TAB Contractor is prevented from completing his work in a timely and continuous manner (according to the established TAB schedule) due to non-operable and/or incomplete HVAC systems, any additional fees for TAB work shall be the responsibility of the Contractor and shall be affected by change order reducing the Contract Amount.

3.6 The contract will not be closed out until all HVAC systems have been successfully TABed by the independent TAB contractor.

3.7 Airside Systems: The Contractor shall provide the following information to the Engineer to substantiate proper start-up and preliminary adjustments of air handler units, belt driven fans, and duct systems.

START-UP REQUIREMENTS FOR HEATING, VENTILATING,
& AIR CONDITIONING (HVAC) SYSTEMS

230970.1

- 3.7.1 Verify that air grilles (supply, return, exhaust, transfer, outdoor, etc.) are installed and connected to the duct system.
- 3.7.2 Verify that duct systems are clean of debris.
- 3.7.3 Verify that ducts attached with flexible connectors are aligned within ½" and have a uniform gap between ducts of 1"-1.5". Flexible connectors shall not leak and shall be insulated.
- 3.7.4 Verify that filters are clean.
- 3.7.5 Verify that balancing dampers at grilles and branch ducts are operational and are fully opened.
- 3.7.6 Verify that fan discharges are appropriate for the outlet ductwork with regards to the "system effect" per AMCA Publication 201. Inappropriate fan discharges will not be accepted.
- 3.7.7 Verify proper fan rotation.
- 3.7.8 Verify fan motor overload elements are correctly sized.
- 3.7.9 Adjust fan speed until CFM is at or above design CFM. Verify that motor is not overloaded.
- 3.7.10 Verify that HVAC control systems are fully operational.
- 3.7.11 Verify outside air requirements have been met. Provide dual settings and readings for damper settings as noted on drawings.
- 3.8 Startup Report: The Contractor shall submit the startup information required by this section to the Engineer in a typed report organized as outlined herein. The Startup Report is required to meet the written notice described herein prior to starting TAB work. TAB work will not start until the Startup Report has been submitted and approved.
- 3.9 After the initial AC unit startup is completed by the AC unit manufacturer (with the Contractor's assistance) the Test and Balance shall be completed. After completion of the Test and Balance work the unit manufacturer shall return to the site and retest and operate the AC equipment and provide a Startup Report.

END OF SECTION

START-UP REQUIREMENTS FOR HEATING, VENTILATING,
& AIR CONDITIONING (HVAC) SYSTEMS

230970.2

SECTION 230985 / TESTING AND BALANCING OF MECHANICAL SYSTEMS1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section. Division-23 Basic Mechanical Materials Sections apply to work of this section.

1.2 Description of Work:

1.2.1 Extent of testing, adjusting, and balancing work (TAB) is indicated by requirements of this section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution systems, hydronic distribution systems and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required.

1.2.2 Coordination: Coordinate with the General Contractor and Mechanical Contractor responsible for the HVAC system installation as required to complete the TAB work.

1.3 The intent of this specification is to balance HVAC systems within the tolerances listed, maintaining the pressure relationships indicated, with a minimum of noise.

1.3.1 Airflow Tolerances:

1.3.1.1 Air Handling: The supply air, return air and outdoor air quantities shall be balanced within $\pm 5\%$ of design values.

1.3.1.2 Exhaust Fans: The exhaust fan quantities shall be set as required to maintain the design exhaust terminal flows within $\pm 5\%$ of design values. values.

1.3.1.3 Ceiling Diffusers, Supply Grilles, Return and Exhaust Inlets: Balance to an air quantity within $\pm 10\%$ of the design values.

1.3.2 Temperature Tolerances:

1.3.2.1 Air Handling Temperatures: The controlled temperatures at AHUs shall be verified to be under control within $\pm 1^\circ\text{F}$ of design values.

1.3.2.2 Room Temperatures: Balance systems and controls within $\pm 1^\circ\text{F}$ of indicated settings.

1.4 Quality Assurance: The TAB Contractor shall be certified as follows:

1.4.1 Tester: A firm certified by Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this project. AABC-certified firms are independent by definition. Comply with AABC's Manual MN-1 "AABC National Standards", as applicable to this work.

TESTING AND BALANCING OF MECHANICAL SYSTEMS

230985.1

- 1.4.2 Industry Standards: Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.
- 1.5 Job Conditions:
- 1.5.1 Do not proceed with testing, adjusting, and balancing work until HVAC work (including Controls) has been completed and is operable. Ensure that there is no residual work still to be completed.
- 1.5.2 Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discarded building materials.
- 1.5.3 Do not proceed until architectural work that would affect balancing (walls, ceiling, windows, doors) have been installed.
- 1.5.4 Testing may proceed system by system, but each HVAC system must be complete as describe herein.
- 1.5.5 The mechanical contractor shall make any changes in pulleys, belts, and dampers, and/or add dampers as required for correct balancing.
- 1.6 Approval Submittals
- 1.6.1 Submit the name of the proposed test and balance company for the Engineer's approval within thirty (30) days after awarding of contract.
- 1.7 Test Reports and Verification Submittals:
- 1.7.1 Submit two (2) copies of a preliminary report two weeks prior to Substantial Completion listing all noted deficiencies. Submit four (4) copies of the dated test and balance report upon completion of TAB work and before the Final Completion Inspection. The report shall include a list of instruments used for the work. The report shall be signed by the supervisor who performed the TAB work.
- 2 PRODUCTS
- 2.1 Patching Materials: Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
- 2.2 Test Instruments: Utilize test instruments and equipment of the type, precision, and capacity as recommended in the referenced standard. All instruments shall be in good condition and shall have been calibrated within the previous six (6) months (or more recently if required by standard).
- 3 EXECUTION

TESTING AND BALANCING OF MECHANICAL SYSTEMS

230985.2

- 3.1 General:
- 3.1.1 Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.
- 3.1.2 Test, adjust and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards, and as modified or detailed herein. Test and balance shall be performed prior to installation of ceiling tiles.
- 3.1.3 Test, adjust and balance systems during summer season for air conditioning systems and during winter season for heating systems, including at least a period of operation at outside conditions within 5°F wet bulb temperature of maximum summer design condition, and within 10°F dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit. The Contractor shall return for a change of seasons test at no additional cost to the Owner and submit the revised TAB report.
- 3.1.4 Punch List: Prepare a deficiency (punch)list for the Contractor with a copy of the Engineer that lists all items that are incorrectly installed or are functioning improperly. Provide a retest after all items are corrected.
- 3.1.5 Prepare TAB report of test results, including instrumentation calibration reports, in format recommended by applicable standards, modified as required to include all data listed herein.
- 3.1.6 Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.
- 3.1.7 Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.
- 3.1.8 Include in the TAB report recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.
- 3.1.9 Include an extended warranty of ninety (90) days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck, or resetting of any component as listed in test report. The TAB company shall provide technicians and instruments and make any tests required by the Engineer during this time period.
- 3.2 Controls:
- 3.2.1 Check all HVAC controls for proper location, calibration and sequence of operation.
- 3.2.2 Check operation of all controllers and controlled devices to verify proper action and

TESTING AND BALANCING OF MECHANICAL SYSTEMS

230985.3

direction. Check the operation of all interlocks.

3.3 Air Balancing:

- 3.3.1 Leakage tests on ductwork must have been completed before air balancing.
- 3.3.2 Set dampers, volume controls and fan speeds to obtain specified air delivery with minimum noise level. Rebalance as required to accomplish this.
- 3.3.3 Record air terminal velocity after completion of balance work.
- 3.3.4 Record all fan speeds.
- 3.3.5 Variable Volume Systems: Measure static pressure at all major branches. Adjust fan controllers for minimum required static pressure at the end of each branch. Report the value of the minimum static pressure that will provide proper air flow in the TAB Report and set the static pressure controller for this value. Balance outlets. Check at both maximum and minimum condition. Traverse main outside air (OA) ducts. Balance the return system. All branches must be above the minimum required static pressure. The supply fan must track and deliver the proper air quantity with no objectionable noise. The system must be stable and operate properly at 50% OA.

3.4 Data Collection:

- 3.4.1 In addition to the data required for any specified performance tests, measure and record the temperatures, pressures, flow rates, and nameplate data for all components listed herein.
- 3.4.2 It is the intent of this section to record data on balanced systems, under normal operating or design conditions.
- 3.4.3 Temperatures:
 - 3.4.3.1 Outside dry and wet bulb temperatures.
 - 3.4.3.2 Dry bulb temperature in each room and at least one wet bulb temperature in each zone.
 - 3.4.3.3 Refrigerant liquid and suction temperatures.
 - 3.4.3.4 Entering and leaving air temperatures (dry bulb and wet bulb) for each air handler.
- 3.4.4 Pressures:
 - 3.4.4.1 Suction and discharge static pressure of each fan.
 - 3.4.4.2 Each refrigerant suction and discharge pressure.
- 3.4.5 Flow rates:

TESTING AND BALANCING OF MECHANICAL SYSTEMS

230985.4

3.4.5.1 Flow rate through each fan.

3.4.6 Nameplate Data:

3.4.6.1 Complete nameplate data for all equipment.

3.4.6.2 Motor data to include horsepower, phase, voltage, RPM, full load nameplate current, fuse rating in disconnect switch, number or manufacturer's size designation, and ampere rating of overcurrent and low voltage protection devices in starters.

END OF SECTION

TESTING AND BALANCING OF MECHANICAL SYSTEMS

230985.5

SECTION 260005 / ELECTRICAL GENERAL1 GENERAL

1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the electrical work as herein called for and shown on the Drawings.

1.2 Related Documents:

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

1.2.2 Provisions of this Section apply to work of all Division 26 Sections.

1.2.3 Review all project Drawings to be aware of conditions affecting work herein.

1.2.4 Definitions:

1.2.4.1 Provide: Furnish, install, and test, complete and ready for intended use.

1.2.4.2 Furnish: Supply and deliver to project site, ready for subsequent requirements.

1.2.4.3 Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, test complete ready for intended use, and similar requirements.

1.3 Permits and Fees: Owner shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto. The only exception to this shall be the fire alarm permit, which shall be obtained by the Contractor.

1.4 Verification of Owner's Data: Prior to commencing work the Contractor shall satisfy himself as to the accuracy of all data indicated on the Drawings and/or provided by the Owner. Should the Contractor discover any inaccuracies, inconsistencies, errors, omissions in the data, ambiguities, or other conditions which might prevent construction being provided as indicated, Contractor shall immediately notify the Engineer. Commencement of work by the Contractor shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data. If any portions of the Contract Documents or any other such data provided by the Owner is inconsistent or otherwise ambiguous, Contractor shall provide materials and labor necessary in the Bid Amount to provide the most expensive of the possible interpretations of the requirements of this Contract for Construction. A credit to the Owner shall be provided by the Contractor if a less expensive interpretation is actually provided; no additional time or addition to the Contract Amount shall be provided if the Contractor fails to comply with this requirement of the Contract Documents. Contractor shall coordinate exact requirements of Division 26 with the requirements of other divisions of this Contract prior to Bid.

1.5 Delivery and Storage of Materials: Materials delivered to site shall be inspected for

ELECTRICAL GENERAL

REV. 11/6/07

260005.1

damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and damage.

- 1.6 Extent of work is indicated in the Drawings, Schedules, and Specification. Singular references shall not be construed as requiring only one device if multiple devices are shown on the Drawings or are required for proper system operation.
- 1.7 Field Measurements and Coordination:
- 1.7.1 The intent of the Drawings and Specifications is to obtain a complete and satisfactory installation. Separate divisional Drawings and Specifications shall not relieve the Contractor or Subcontractors from full compliance of work of his trade indicated on any of the Drawings or in any Section of the Specifications. Report conflicts prior to start of work.
- 1.7.2 Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all Contract Documents and approved shop drawings to verify exact dimension and locations. Do not scale electrical drawings, rely on dimensions shown on architectural or structural drawings.
- 1.7.3 Coordinate work in this Division with all other trades in proper sequence to insure that the total work is completed within Contract time schedule and with minimum cutting and patching.
- 1.7.4 Locate all equipment, materials, and apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on electrical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.
- 1.7.5 Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval from Engineer or Architect.
- 1.7.6 Carefully examine any existing conditions, piping, and premises. Compare Drawings with existing conditions. Report any observed discrepancies. Written instructions will be issued by the Engineer to resolve discrepancies.
- 1.7.7 Because of the small scale of the Drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate material, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and shall not order materials or perform work without verification. No extra compensation will be allowed because field measurements vary from the dimensions on the Drawings. If field measurements show that equipment or material cannot be fitted, the Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

ELECTRICAL GENERAL

REV. 11/6/07

260005.2

- 1.8 Interpretation of the Contract Documents is sometimes necessary due to perceived ambiguities or conflicts in the contract requirements. Where ever more than one interpretation of the requirements of the Contract Documents can be made, the Contractor shall provide materials and labor necessary to accommodate providing the most expensive of the different interpretations. No change order shall be processed for a failure to comply with this requirement.
- 1.9 Guarantee and Service
- 1.9.1 Owner reserves the right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.
- 1.10 Approval Submittals
- 1.10.1 Before ordering any materials or equipment, and within 30 days after the award of Contract the Contractor shall submit to the Engineer one complete submittal control log showing the make, type, manufacturer's name and trade designation of all equipment.
- 1.10.1.1 This log shall be accompanied by six (6) copies of the manufacturer's printed specifications and shop drawings for each piece of equipment or specialty and shall give dimensions, diagrams, descriptive literature, capacity or rating, kind of material, finish, guarantee, etc., and such other detailed information as the Engineer may require.
- 1.10.1.2 When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.
- 1.10.1.3 Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.
- 1.10.1.3.1 Submittals shall be properly organized in accordance with the approved submittal control log.
- 1.10.1.3.2 Submittals shall not include items from more than one specification section in the same submittal package.
- 1.10.1.3.3 Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.
- 1.10.1.3.4 Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date; or at a minimum, stamp shall indicate the exceptions taken by the Contractor and these exceptions shall not indicate substantial deviations from the requirements of the Contract Documents in the

judgement of the Engineers.

- 1.10.1.3.5 Submittals that include a series of fixtures or devices shall be organized by the fixture number or device type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.
- 1.10.1.3.6 The electrical design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this change will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.
- 1.10.2 If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.
- 1.10.3 Review of submittals, product literature, catalog data, or schedules by the Engineer shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.
- 1.10.4 Submit shop drawings and any other drawings specifically called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than ¼" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.
- 1.11 Independent Testing Agency: Where testing by an independent testing agency is required or selected by the Contractor, the requirements below shall be met.
- 1.11.1 The testing firm shall be an independent testing organization which shall function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing firm.
- 1.11.2 The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.

ELECTRICAL GENERAL

REV. 11/6/07

260005.4

1.11.3 The testing firm shall utilize technicians who are regularly employed by the firm for testing services.

1.11.4 The testing firm shall submit proof of the above qualifications with bid documents.

2 PRODUCTS

2.1 All materials shall be new and unused, the best of their respective kinds, suitable for the conditions and duties imposed on them. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following Sections.

2.2 Equipment and Materials:

2.2.1 Equipment and materials furnished under this Division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar equipment or materials.

2.2.2 Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

2.2.3 The label of the approving agency, such as UL or NEMA, by which a standard has been established for the particular item shall be in full view. Materials shall be UL-listed for the application specified or indicated on the Drawings or Specifications. All materials provided shall be installed in conformance with their UL-Listing requirements and with their manufacturer's installation instructions.

2.2.4 Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the Drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products meet detailed specifications and that size and arrangement of equipment are suitable for installation.

2.2.5 Model Numbers: Catalog numbers and model numbers indicated in the Drawings and Specifications are used as a guide in the selection of the equipment and are only listed for the Contractor's convenience. The Contractor shall determine the actual model numbers for ordering equipment and materials in accordance with the written description of each item and with the intent of the Drawings and Specifications.

2.3 Requests for Substitution:

2.3.1 Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified. Other systems, products, equipment or materials may be accepted

only if in the opinion of the Engineer, they are equivalent in quality and workmanship and will perform satisfactorily its intended purpose. All such substitutions in materials or equipment shall be approved in writing by the Engineer.

2.3.2 In making requests for substitutions, the Contractor shall list the particular system, product, equipment or material he wishes to substitute and at bid time the Contractor shall state the amount he will add or deduct from his base bid if the substitution is approved by the Engineer. If no deduction or addition to the base bid is allowed by the Contractor for such substitution, it shall be so stated on the request.

2.3.3 Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.

2.3.3.1 Required product cannot be supplied in time for compliance with Contract time requirements.

2.3.3.2 Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

2.3.3.3 Substantial cost advantage is offered Owner after deducting off-setting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3.4 All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

Principle of operation.

Materials of construction or finishes.

Thickness of materials.

Weight of item.

Deleted features or items.

Added features or items.

Changes in other work caused by the substitution.

Performance and rating data.

If the approved substitution contains differences or omissions not specifically called to the attention of the Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products at the Contractor's expense.

3 EXECUTION

3.1 Workmanship: All materials, fixtures, and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance,

shall be removed and replaced when so directed by the Engineer.

3.2 Coordination:

- 3.2.1 The Contractor shall be responsible for full coordination of the electrical systems with shop drawings of the building construction so the proper openings and sleeves or supports etc., are provided for conduit, devices, or other equipment passing through slabs or walls.
- 3.2.2 Means of Support for all lighting fixtures, raceway, devices, or other items suspended from the ceiling (or otherwise from above) shall be fully coordinated with and in compliance with all requirements and recommendations of the manufacturer of equipment suspended.
- 3.2.3 Coordination with Other Divisions of this Contract shall be provided, prior to bid, as necessary to properly supply power to equipment in compliance with the UL Listings of this equipment. The division 26 design may provide a number of branch circuits, phases, ampacity, and overcurrent protection devices for design-basis equipment, provided by other divisions of this contract, conforming with the equipment manufacturer's specifications available at the time of design. Manufacturer's specifications available at the time of design often differ substantially from the specifications of the equipment actually provided under the contract for construction due to value engineering, due to the use of alternate approved equipment manufacturers, or due to periodic changes in the specifications of the equipment provided by other divisions of this contract. Prior to bid, Contractor shall coordinate with specifications, recommendations, and requirements of equipment to actually be provided under contract for construction. If requirements of equipment actually provided are different from electrical design, Contractor shall make all changes required without increase in contract amount or time schedule. Such changes may include – but shall not be limited to – changing the size, type, or quantity of conductors, conduits, circuit breakers, fuse protection, panelboards, switchboards, and disconnect switches. No changes in time schedule or contract amount shall be approved due to a failure to perform this required coordination.
- 3.2.4 It shall be the Contractor's responsibility to see that all equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the Drawings.
- 3.2.5 All Optional Color Selections which are made for any electrical materials shall be approved by the Architect and Owner prior to ordering any materials.
- 3.2.6 All connections to fixtures and equipment shown on the Drawings shall be considered diagrammatic unless otherwise indicated by a specific detail on the Drawings. The actual connections shall be made to fully suit the requirements of each case and adequately provide for servicing.
- 3.2.7 The Contractor shall protect equipment and fixtures at all times during storage and construction. He shall replace all equipment and fixtures which are damaged as a result of inadequate protection.

- 3.2.8 Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.
- 3.2.9 Start of work will be construed as acceptance of suitability of work of others.
- 3.3 Construction Electrical Utilities: Provide all temporary wiring for power and light required for construction purposes and remove such temporary wiring when use is no longer required.
- 3.4 Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Engineer and Owner and this work shall be done at the time best suited to the Owner. Outages must be scheduled through the Engineer. Extent, length, and timing of outages shall be reviewed by the Engineer. Services shall be restored the same day. Provide temporary power or other services as required during outages.
- 3.5 Cutting and Patching: Contractor shall be responsible for cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under these Specifications. Obtain permission from Engineer before cutting any structural items.
- 3.6 Equipment Setting: Bolt equipment directly to concrete pads or foundations, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.
- 3.7 Additional Steel Support Hardware required for the installation of any electrical or other equipment provided shall be provided by the Contractor. Contractor shall provide materials and labor necessary to ensure that all products are rigidly secured to structure pursuant to applicable portions of NEC 300-11. This shall include – but shall not be limited to – providing additional threaded rods, metal framing, and other hardware required to minimize horizontal as well as vertical movement. Means of support shall be clearly indicated and fully described in the submittal for items suspended. Threaded rods shall not be used as sole means of support for suspended raceway unless approved in writing by engineer or unless assembly can be demonstrated to be substantially free from significant horizontal or vertical sway or movement as is required to comply with NEC. Threaded rods shall not be used as means of support for lighting fixtures unless approved in writing by engineer.
- 3.8 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 26. Obtain matched color coatings from the manufacturer and apply as directed by manufacturer. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.
- 3.9 Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, Contractor is to carefully clean and leave premises free from debris and in a safe condition.

- 3.10 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.
- 3.11 Record Drawings:
- 3.11.1 During the progress of the work the Contractor shall record on their field set of Drawings the corrections, variations, and deviations for systems which are not installed exactly as shown on the Contract Drawings.
- 3.11.2 Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 Sections.
- 3.12 Acceptance:
- 3.12.1 Request inspections as required under the Supplementary or General Conditions. Conceal no work until inspected.
- 3.12.2 Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.
- 3.12.3 Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with the project, for a period deemed necessary by the Owner to instruct permanent operating personnel in the operation of equipment and control systems.
- 3.12.4 Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders and organized by system or section. Manuals shall contain:
- 3.12.4.1 Detailed operating instructions and instructions for making minor adjustments.
- 3.12.4.2 Complete wiring and control diagrams.
- 3.12.4.3 Routine maintenance operations.
- 3.12.4.4 Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
- 3.12.5 Control Diagrams: Frame under glass and mount on equipment room wall.
- 3.12.6 Test together and separately to determine that:
- 3.12.6.1 System is free from short circuits and other faults.
- 3.12.6.2 Motor starter overload devices are sized correctly.
- 3.12.6.3 Motors rotate correctly.

- 3.12.6.4 All equipment operates correctly and as specified.
- 3.12.7 Warranties: Submit copies of all manufacturer's warranties.
- 3.12.8 Record Drawings: Submit "Record Drawings".
- 3.12.9 Install engraved metal or plastic nameplates or tags on controls, panels, switches, starters, timers, and similar operable equipment, keyed by number to operating instructions. Dymo type labels are not acceptable.
- 3.12.10 Controls Wiring and Alarm Wiring shall be labeled by tags at all junction boxes, device boxes, and all enclosures.
- 3.12.11 Labeling for Boxes and Electrical Devices – Provide box and device labeling as follows:
- 3.12.11.1 Switches – Each light switch shall be marked by panel name and circuit number using numbered vinyl cloth adhesive markers, 1/4" minimum height. Locate marker behind device cover plate so it can be readily identified by removal of the cover plate. Thomas and Betts E-Z Code Markers are acceptable.
- 3.12.11.2 Receptacles – Each receptacle shall be marked by panel name and circuit number using numbered vinyl cloth adhesive markers, 1/4" minimum height. Locate marker behind device cover plate so it can be readily identified by removal of the cover plate. Thomas and Betts E-Z Code Markers are acceptable.
- 3.12.11.3 Boxes – All junction box covers in unfinished spaces shall be marked by panel name and circuit number using indelible ink, 3/4" minimum height. Locate marker so it can be readily identified (without) removal of the cover plate.
- 3.12.12 Acceptance will be on the basis of tests and inspections of the work. A representative of the firm which performed the testing shall be in attendance to assist during inspection. Contractor shall furnish necessary electricians to operate system, make any necessary adjustments and assist with final inspection.

This is a sample cover sheet. Use one for each shop drawing.

PROJECT NAME
PROJECT NUMBER

ARCHITECT/ENGINEER: Campbell Spellicy Engineering, Inc.

CONTRACTOR: XYZ Construction

Use whatever standard headings you want here

SUBCONTRACTOR: ABC Mechanical Contractor

SUPPLIER: MNO Supplier

MANUFACTURER: Various

DATE: 2/15/95

SAMPLE

SECTION: 26100/Basic Materials and Methods

1. Conduit – EMT – QRS Manufacturer, Part No. 2

List each category separately

2. Conduit – RGS – QRS Manufacturer, Part No. 1

3. Conduit – PVC – QRS Manufacturer, Part No. XYZ

4. Conduit Fittings – EMT – QRS Manufacturer, Part No. ABC

5. Conduit Fittings – RGS – QRS Manufacturer, Part No. DEF

6. Conduit Fittings – PVC – QRS Manufacturer, Part No. GHI

CSEI will only stamp approvals on this sheet and will only review submittals which have been reviewed with no substantial or prohibitive exceptions by the Contractor.

END OF SECTION

ELECTRICAL GENERAL

REV. 11/6/07

260005.11

SECTION 260020 / CODES AND STANDARDS

1 GENERAL

- 1.1 All work under Division 26 shall be constructed in accordance with the codes and standards listed herein. The design has been based on the requirements of these codes and standards. While it is not the responsibility of the Contractor to verify that all work called for complies with these codes and standards, he shall be responsible for calling to the Engineer's attention any details on the Drawings and/or Specifications that are not in conformance with these or other codes and standards. Current issue of code applies unless specifically noted otherwise.
- 1.2 Comply with regulations and codes of suppliers of utilities.
- 1.3 Where no specific method or form of construction is called for in the Contract Documents, the Contractor shall comply with code requirements when carrying out such work.
- 1.4 Where code conflict exists, generally the most stringent requirement applies.
- 1.5 Codes or standards applying to a specific part of the work may be included in that section.

2 CODES

- 2.1 Florida Building Code (FBC) 2014, with all currently-adopted revisions, supplements, or other changes.
- 2.2 Florida Fire Prevention Code, 2014, with all currently-adopted revisions, supplements, or other changes.
- 2.3 National Electrical Code (NFPA 70 (National Fire Protection Association)), 2011
- 2.4 National Electrical Safety Code (NESC)
- 2.5 Life Safety Code (NFPA 101), 2012
- 2.6 Standard for Emergency and Standby Power Systems (NFPA 110)
- 2.7 Physically Handicapped (ANSI A117.1)
- 2.8 Florida Accessibility Code for Building Construction (Chapter 11 of FBC)
- 2.9 National Fire Alarm Code (NFPA 72), 2010

3 STANDARDS

- 3.1 All electrical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments:

CODES AND STANDARDS

260020.1

- 3.1.1 American National Standard Institutes (ANSI)
- 3.1.2 Illuminating Engineering Society (IES).
- 3.1.3 Institute of Electrical and Electronics Engineers (IEEE).
- 3.1.4 National Electrical Manufacturer's Associations (NEMA).
- 3.1.5 National Fire Protection Association (NFPA).
- 3.1.6 Occupational Safety and Health Act (OSHA).
- 3.1.7 Underwriter's Laboratories, Inc. (UL).
- 3.1.8 State Requirements for Educational Facilities (SREF – Section 423 of FBC).
- 3.1.9 State of Florida Rules for Hospital Licensure, State of Florida Agency for Health Care Administration, Chapter 59A-3.

END OF SECTION

CODES AND STANDARDS

260020.2

SECTION 260030 / ELECTRICAL RELATED WORK1 DIVISION 1 - GENERAL REQUIREMENTS

1.1 All Division 1 Sections apply to all Division 26 Sections.

1.2 Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 26 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

2 DIVISION 2 - SITEWORK

2.1 Specific requirements for excavation and backfill for underground conduit are contained in Section 26105.

2.2 The following is part of Division 26 work.

2.2.1 Underground electrical utilities.

3 DIVISION 3 - CONCRETE

3.1 Perform the following as part of Division 26 work, complying with the requirements of Division 3, Concrete.

3.1.1 Curbs, foundations and pads for electrical equipment.

3.1.2 Encasement of electrical work.

3.1.3 Underground structural concrete to accommodate electrical work.

3.1.4 Rough grouting in and around electrical work.

3.1.5 Patching concrete cut to accommodate electrical work.

4 DIVISION 4 - MASONRY

4.1 Refer to Division 4, Masonry for:

4.1.1 Patching openings to accommodate electrical work.

5 DIVISION 5 - METALS

5.1 Refer to Division 5, Metals for:

5.1.1 Supports for electrical work.

5.1.2 Framing openings for electrical equipment.

6 DIVISION 7 - THERMAL & MOISTURE PROTECTION

ELECTRICAL RELATED WORK

260030.1

- 6.1 Refer to Division 7, Thermal and Moisture Protection for:
 - 6.1.1 Installation of all supports for electrical work.
 - 6.1.2 Caulking and waterproofing of all wall and roof mounted electrical work.
- 6.2 Perform the following as part of Division 26 work, complying with Division 7 requirements.
 - 6.2.1 Fire barrier penetration seals.
 - 6.2.2 Caulking and related shielding around ducts and pipes for sound isolation and attenuation.
- 7 DIVISION 8 - DOORS AND WINDOWS
 - 7.1 Refer to Division 8, Doors & Windows for:
 - 7.1.1 Installation of all access doors for electrical work.
- 8 DIVISION 9 - FINISHES
 - 8.1 Refer to Division 9, Finishes for:
 - 8.1.1 Painting exposed conduit and equipment.
 - 8.1.2 Painting structural metal and concrete for electrical work.
 - 8.1.3 Painting access panels.
 - 8.2 Colors shall be selected by the Architect for all painting of exposed electrical work unless specified herein.
 - 8.3 Perform the following as part of Division 26 work.
 - 8.3.1 Touch up painting of factory finishes.
- 9 DIVISION 23 - MECHANICAL
 - 9.1 Mechanical Contractor shall furnish to Electrical Contractor all necessary nameplate data, equipment power requirements, wiring diagrams, etc., pertaining to the electrical phase of mechanical installation, as well as all required motors, on/off switches, warning lights, relays, and control devices.
 - 9.2 Electrical Contractor shall furnish and install all power wiring, starters and contactors, and make final electrical connections to motors, on/off switches, warning lights, relays, and control devices.

ELECTRICAL RELATED WORK

260030.2

- 9.3 Disconnect switches for mechanical equipment shall be furnished and installed by the Electrical Contractor, unless specifically noted on the Drawings as being furnished as part of mechanical equipment.
- 9.4 All duct-mounted smoke detectors shall be furnished and wired by the Electrical Contractor and installed by the Mechanical Contractor.

END OF SECTION

ELECTRICAL RELATED WORK

260030.3

SECTION 260040 / ALTERATIONS AND ADDITIONS TO EXISTING WORK1 GENERAL

- 1.1 The provisions of this Section are in addition to the provisions of Division 1, Building Modifications.
- 1.2 Building will be occupied by owner during construction.

2 PERFORMANCE2.1 General:

- 2.1.1 All necessary additions and alterations to existing work shall be included as required to provide and maintain a complete and proper electrical installation. As necessary, relocate existing electrical work so other trades can pursue their work and maintain building in service, when occupied.
- 2.1.2 The work shall include, but not be limited to, the following:
 - 2.1.2.1 Relocation of fixtures, pull boxes, electrical ducts, and other similar items, to permit the installation of new equipment.
 - 2.1.2.2 Installation of new conduits, conductors, wiring, and wiring devices, in order to maintain temporary and permanent use of electrical facilities.
 - 2.1.2.3 Disconnection and reconnection of circuits as required for continued operation of services.
 - 2.1.2.4 Provision for the relocation of all mechanical work as required for proper installation of electrical work where not shown or specified in other sections or on other drawings.
- 2.1.3 Unused, existing, surface mounted work shall be removed and concealed. Outlets shall be blanked up.
- 2.1.4 Existing work to be maintained shall be reconnected and shall have all outlets, boxes and devices accessible after completion of work by other trades.
- 2.1.5 Within NEC limitations, existing conduits may be reused after cleaning.
- 2.1.6 All new work in existing areas shall be exposed on walls in unfinished areas and concealed in finishes in finished areas. Where cutting and patching are required, finishes shall match existing surface finishes. In existing finished areas, all work shall be concealed in new finishes.
- 2.1.7 Consolidate existing and new building ground systems.
- 2.1.8 In general, all new work is intended to be concealed in finishes to be added under this project.

ALTERATIONS AND ADDITIONS TO EXISTING WORK

260040.1

2.2 Existing Building Power Outages:

2.2.1 Refer to Section 01016.

2.2.2 Where portions of buildings are altered, and remainder of building continues in operation, temporary wiring shall be provided to maintain all necessary building functions. Provide all equipment, material, labor for a continuous functional system.

2.3 Temporary Wiring for Remodeled Areas:

2.3.1 Progress of the work will require temporary wiring installations to utilize a portion of the remodeled area. Wiring may not be the final, permanent installation, and shall be included as necessary to supply required electrical function.

2.4 Planning for Sequence of the Work:

2.4.1 Electrical feeders, branch wiring, signal wiring, and other similar work as shown and specified shall be scheduled to correspond with the sequence of work necessary to demolish, remove and construct new work.

2.4.2 Close coordination in scheduling is required between the Owner, Contractor, and other trades to assure a smooth work flow with minimum interference and interruption to building power and communication systems.

2.5 Openings in Existing Work:

2.5.1 Provide cutting and patching of existing work as required. Verify exact locations and materials before performing work. Cutting of structural members and bearing walls shall not be done without written approval of the Engineer.

2.6 Verification of Existing Work:

2.6.1 Where shown on the Drawings, work which is "existing" is assumed to be in place and suitable for the necessary alterations and additions required. Contractor shall carefully field check these items and include alterations as may be necessary for proper installation and guarantee. Minimum items requiring verification shall include – but shall not be limited to – the following: voltage, ampacity, and phase arrangement of any existing circuits to which new or existing loads are to be connected; physical dimensions of existing equipment and building spaces at locations indicated for any new items to be provided or existing items to be relocated (as necessary to confirm adequacy of necessary space including required clearances); and any other existing conditions such as other types of space conflicts or uncoordinated methods of support which would prevent providing the materials and labor as specified in the Contract Documents (for example, a lighting fixture specified as a flange-type fixture for hard ceilings which is indicated in an area of an existing lay-in ceiling which is not indicated as being changed to a hard ceiling has an uncoordinated method of support).

2.7 Removal and Ownership of Existing Work:

ALTERATIONS AND ADDITIONS TO EXISTING WORK

260040.2

- 2.7.1 Where indicated on the Drawings, existing electrical work shall be removed. Unless otherwise specified, all equipment and materials shall remain the property of the Owner except as that judged obsolete or unusable by the Engineer or Owner.
- 2.7.2 If any new circuit breakers are provided in any existing panelboards or in any existing switchboards as part of this Contract for Construction, then the new circuit breakers provided shall have a short-circuit interrupting-capacity (RMS symmetrical amps) which is greater than or equal to the highest capacity of all of the existing circuit breakers in the existing switchboard or panelboard into which the new circuit breakers are added.
- 2.7.3 Property of Owner shall be delivered to a location where directed by the Owner and all other items shall be promptly removed from the job site.
- 2.8 Cutting of Concrete Materials:
- 2.8.1 Holes for materials and supports shall be made with uniform speed rotation drilling equipment which does not provide effects associated with impact type equipment.
- 2.8.2 The use of impact drills, air drills, and the like is not acceptable for this project.
- 2.9 Maintenance of Existing Lighting Systems and Electric Outlets:
- 2.9.1 Where new lighting layouts are not shown on the Drawings, the existing lighting fixtures and wiring controls shall be reused. If necessary, these items shall be temporarily removed (as light fixtures), if necessary, and shall be reinstalled where removed. New wiring from existing sources shall be provided where remodeling operations require. These items are not shown on the Drawings and shall be site determined by the Contractor.
- 2.9.2 Where existing electrical outlets are located in areas of remodeling, these shall be maintained in service. This work is not shown on the Drawings and shall be site determined by the Contractor.
- 2.10 If any work is performed in existing panelboards or switchboards, Contractor shall provide a typewritten circuit directory with a protective covering in a frame inside the door which indicates all changes to the panelboard or switchboard. In this directory, provide unique labeling for each feeder or branch circuit which indicates load type (REC, LTG, AHU-1, etc.), room number(s) or other location description of the area served, and directional information where needed (N, NE, NW, SW, S, etc.) to clarify location. No two descriptions shall be the same in this directory.

END OF SECTION

ALTERATIONS AND ADDITIONS TO EXISTING WORK

260040.3

SECTION 260100 / BASIC MATERIALS AND METHODS

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.
- 1.2 This Section is a Division-26 Basic Materials and Methods Section, and is part of each Division-26 Section making reference to or requiring products specified herein.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow. This shall include submittal for means of support of equipment, if necessary, as indicated below in this section.

2 PRODUCTS

- 2.1 Acceptable Producers: Allied Tube and Conduit; Anaconda Industries; Appleton Electric; Belden Corporation; W.H. Brady Co.; Carlon; Crouse-Hinds Co.; ETP; Elcen Metal Products Co.; General Cable Co.; General Electric Co.; Hoffman Engineering Co.; Harvey Hubbell, Inc.; Midland-Ross Corporation; Okonite Co.; 0-Z/Gedney; Raco, Inc.; Republic Steel Corporation; 3M; Southwire; Seton Nameplate; Square D Co.; Thomas and Betts; Triangle PWC, Inc.; Walker Parkersburg Textron; Wiremold Co.
- 2.2 As indicated, products listed herein may be common to various Division 26 Sections for this project.
- 2.3 All materials and equipment specified herein shall be UL listed or approved according to the requirements of applicable NEC articles.
- 2.4 Raceways:
 - 2.4.1 Rigid Metal Conduit (NEC Art. 344) shall be galvanized steel, protected inside and outside.
 - 2.4.2 Rigid Nonmetallic Conduit (NEC Art. 352) shall be polyvinyl chloride (PVC), schedule 40 or schedule 80, as indicated on the Drawings.
 - 2.4.3 Liquidtight Flexible Nonmetallic Conduit (NEC Art. 356) shall be flame-resistant nonconductive flexible PVC suitable for direct burial and with smooth inner surface with integral reinforcement within the conduit wall.
 - 2.4.4 Electrical Metallic Tubing (EMT) (NEC Art. 358) shall be steel, protected inside and outside by a coating of approved corrosion-resistant material such as zinc or cadmium.
 - 2.4.5 Flexible Metal Conduit (NEC Art. 348) shall be galvanized steel, protected inside and outside.
 - 2.4.6 Liquid Tight Flexible Metal Conduit (NEC Art. 350) shall be galvanized steel, protected

BASIC MATERIALS AND METHODS

260100.1

- inside and outside with an extruded outer liquid tight, non-metallic, sunlight resistant jacket. Use with standard liquid tight fittings.
- 2.4.7 Surface Raceways (NEC Art. 386) shall be metal surface race-ways, two piece, snap on cover type, rectangular, rust resistant undercoat and gray, buff or brown finish. Steel shall be minimum .040 inches.
- 2.4.8 Wireways (NEC Art. 376) shall be sheet metal troughs with hinged or removable covers, rust resistant undercoat and gray finish coat. Sizes shall be as indicated on the Drawings or determined by the Contractor based on NEC requirements according to the number of conductors enclosed. Exterior units shall be weatherproof. Steel shall be minimum 14 gauge.
- 2.4.9 Busways (NEC Art. 368) shall be of sheet metal enclosure components, ventilated or non-ventilated, indoor or outdoor type as indicated on the Drawings with copper bus, insulators or insulation jackets, and copper or brass bus fastenings. Sheet metal shall have rust resistant undercoat and factory standard color finish coat. Ampacity and bracing shall be as indicated on the Drawings. Provide full neutral bus and ground bus unless otherwise indicated on the Drawings.
- 2.5 Raceway Fittings:
- 2.5.1 Rigid Metal Conduit shall have threaded fittings, galvanized steel or threadless compression galvanized steel. Fittings shall be rain tight/concrete tight.
- 2.5.2 Rigid Non-Metallic Conduit shall have polyvinyl chloride (PVC) fittings suited for the purpose and joined together by a method approved for the purpose. Schedule 80 conduit sections may be joined together with threaded fitting connectors.
- 2.5.3 Electrical Metallic Tubing (EMT) fittings shall be compression type, all zinc plated steel; zinc plated steel body with cadmium plated malleable iron nut or cadmium plated malleable iron body and compression nut. Fittings shall be UL listed for rain tight, concrete tight or rain tight/concrete tight. EMT fittings for sizes 2" and larger may be zinc plated steel, set screw type unless otherwise indicated on the Drawings. Die cast or indenter type fittings shall not be permitted.
- 2.5.4 Flexible Metal Conduit fittings shall be zinc plated steel or cadmium plated malleable iron screw type with insulated throat and angular wedge fitting between convolutions of conduit.
- 2.5.5 Liquid-tight Flexible Metal Conduit fittings shall be cadmium plated, malleable iron or steel with compression type steel ferrule and neoprene gasket sealing rings, with insulated throat.
- 2.5.6 Surface Raceway fittings shall be steel with rust resistant undercoat and finish coat to match the surface raceway. The fittings shall be so designed that the sections can be electrically and mechanically coupled together without subjecting the conductors to abrasion.

BASIC MATERIALS AND METHODS

260100.2

- 2.5.7 Wireway fittings shall be steel with rust resistant undercoat and finish coat to match the wireway. The fittings shall be so designed that the sections can be electrically and mechanically fitted together to form a complete system. Dead ends shall be closed.
- 2.5.8 Expansion Fittings shall be corrosion protected steel for metal raceways, and PVC for non-metallic raceways. Provide bonding fittings for metal raceways and grounding conductors for PVC raceways.
- 2.5.9 Materials for Conducting Power such as busways, panelboard busbars, switchboard busbars, wires, conductors, or other cable assemblies (including non-current carrying conductive materials such as grounding conductors and buses and neutral conductors and buses) shall not be made of aluminum unless specifically specified as being comprised of aluminum elsewhere in the Contract Documents.
- 2.5.10 Couplings and Unions shall be galvanized steel, tapered thread-standard conduit couplings for rigid metal conduit. PVC couplings for rigid non-metallic conduit shall use approved adhesive, and threaded couplings shall be used for schedule 80 conduit. Split couplings shall be galvanized steel. Unions shall be ground joint type galvanized steel.
- 2.6 Bushings:
- 2.6.1 Bushings shall be one of the following types:
- 2.6.1.1 Galvanized steel, threaded or threadless
- 2.6.1.2 Galvanized-plated steel, threaded or threadless, phenolic insulated with temperature rating of 150°C
- 2.6.1.3 Cadmium-plated malleable iron, threaded or threadless
- 2.6.1.4 Cadmium-plated malleable iron, threaded or threadless, phenolic insulated, with temperature rating of 150°C
- 2.6.1.5 Phenolic with temperature rating of 150°C
- 2.6.1.6 Zinc-plated steel, or cadmium plated malleable iron; threaded or threadless; non-insulated or insulated with grounding connector or grounding lug
- 2.6.2 Insulated bushings shall have phenolic insulation molded to the bushing
- 2.7 Conduit Seals: Conduit Seals shall be galvanized steel, tapered thread for rigid metal conduit with sealing compound and fiber.
- 2.8 Boxes: All boxes shall be 4" x 4" x 1½" deep or larger.
- 2.8.1 For indoor work, flush type junction, outlet and switch boxes shall be galvanized pressed steel.
- 2.8.2 Junction Boxes for exposed work shall be FS or FD type. Boxes shall be threaded, cadmium plated malleable iron with weatherproof galvanized or stainless steel cover and

BASIC MATERIALS AND METHODS

260100.3

- neoprene cover gaskets.
- 2.8.3 Boxes for exposed work in indoor finished spaces shall be FS or FD type, with the appropriate covers for the device and location. Surface type pressed steel boxes shall be used in nonfinished spaces only.
- 2.8.4 Fabricated Boxes shall be steel with inside and outside surfaces coated with corrosion-resistant paint or weather resistant coating. Covers shall be hinged or screwed with or without gaskets depending on location.
- 2.8.5 Floor Boxes, unless noted otherwise on the Drawings, shall be cast iron for watertight application, galvanized steel for standard application. Boxes shall be adjustable for both height and tilt and shall have a bronze hinged lid for receptacles and 2" hinged lid for telephone and sound outlets. Carpet rings shall be provided when carpet is to be installed.
- 2.9 Cabinets: Cabinets shall be flush or surface mounted as indicated on the Drawings, and fabricated of code gauge galvanized steel with turned lip on front. Cover shall be flat steel sheet with hinged door (concealed hinges) and flush catch and lock. All cabinets for the project shall be keyed alike. Cover shall be treated with rust-resistant undercoat and grey baked finish coat.
- 2.10 Low Voltage Conductors:
- 2.10.1 Conductors shall be 98% conductivity copper, medium or soft drawn. Sizes shall be as indicated on the Drawings. Sizes No. 10 and smaller shall be solid unless noted on the drawings. Sizes No. 8 and larger shall be stranded. Insulation shall be THWN only except SI in switchgear.
- 2.10.2 Conductor Identification: Ungrounded conductors larger than No. 10 and grounded conductors larger than No. 6 may have factory colored insulation or black insulation with color coded identification tape.
- 2.10.3 Refer to the section "Conductor and Cable Identification" for color coding and identification of conductors.
- 2.10.4 Identification tags or labels shall be vinyl coated, with 1/8" minimum height, black characters on white background or stamped brass. Tag or label shall be 1/4" wide minimum.
- 2.10.5 Wire Connectors for 600 volt conductors Size No. 18 to No. 6 AWG shall be pressure type, spring connectors. Use 600 volt splicer-reducer pressure connectors for copper conductors to 500 MCM. Use rectangular, solderless pressure connectors or split bolt copper alloy connectors for copper conductors to 1000 MCM.
- 2.10.6 Wire Pulling Lubricant shall be a product produced specifically for wire pulling lubrication.
- 2.11 Ground Rods: Ground rods shall be copper clad steel, 3/4" diameter, 10' length minimum or as indicated on the Drawings. Use thermic welding to connect grounding conductor

BASIC MATERIALS AND METHODS

260100.4

- to ground rod.
- 2.12 Sleeves: Sleeves shall be hot dip galvanized metal flanged type or schedule 40 galvanized steel pipe.
- 2.13 Concrete Inserts: Concrete inserts shall be hot dip galvanized steel, minimum 14 gauge cut to necessary length for the purpose. Use galvanized hardware.
- 2.14 Metal Framing System:
- 2.14.1 Steel channel sections shall be rolled from commercial grade steel.
- 2.14.2 The cross-sectional width dimension of the channel shall be a minimum of 1½." The depth shall be sized to satisfy the load requirements and deflection.
- 2.14.3 Channels 1½" in depth or greater shall be rolled from 12 gauge steel. Channels smaller than 1½" in depth may be 14 gauge steel.
- 2.14.4 Attachment holes shall be factory punched on hole centers equal to the channel cross-sectional width dimension and shall be maximum of 9/16" diameter.
- 2.14.5 The finish on steel components shall be electro-galvanizing for use in dry locations indoor only, hot dip galvanized elsewhere.
- 2.14.6 Nuts, bolts, washers, straps, threaded rod and other parts shall be protected with the same finish as the channels.
- 2.15 Fire Barrier Penetration Seals:
- 2.15.1 Provide seals for any opening through fire-rated walls, floors, or ceilings used as passage for electrical components such as conduit or electrical boxes.
- 2.15.2 Cracks, voids, or holes up to 4" diameter shall be filled with putty, caulking, or one-piece intumescent elastomer which is non-corrosive to metal, compatible with synthetic cable jackets, and capable of expanding 10 times when exposed to flame or heat.
- 2.15.3 For openings 4" or greater use a sealing system capable of passing 3-hour fire test in accordance with ASTM E-814. Sealing system shall consist of wall wrap or liner, partitions, and end caps capable of expanding when exposed to temperatures of 250 to 350°F.
- 2.16 Painting: Painting products are specified in Division 9 - "Finishes".
- 2.17 Equipment Identification: Provide nameplate for equipment identification sized as indicated on the Drawings. Nameplate shall be 3" x 1" minimum. Plates shall be laminated plastic (micarta) with white core. Mount plates with a minimum of two stainless steel screws, with round head or filister head. Normal power nameplates shall be Black. Emergency Power nameplates shall be Red.

BASIC MATERIALS AND METHODS

260100.5

- 2.18 Pull Wire and Pull Rope:
- 2.18.1 Pullwire shall be galvanized steel wire, No. 14 AWG minimum size.
- 2.18.2 Pullrope shall be ply cord with 2000 lbs. tensile strength, minimum.
- 2.19 Terminal Strips: Terminal strips shall be sectional barrier type made of molded phenolic for use in wiring control panels. Number of terminals and ampacity shall be as indicated on the Drawings. The binding head shall be screw in type.
- 2.20 Equipment Backboards: Equipment Backboards shall be exterior grade $\frac{3}{4}$ " plywood finished on one side. Finish backboard with fire retardant gray paint before mounting.

3 EXECUTION

3.1 General:

- 3.1.1 Materials and equipment shall be installed in a neat and workmanlike manner according to the standards of the industry. Materials and equipment installed and not meeting the standards of the industry may be rejected and required to be removed and reinstalled by the Contractor at no additional cost to the Owner.
- 3.1.2 Contractor is responsible for the safety and conditions of the materials and equipment installed until Owner's beneficial occupancy or acceptance.
- 3.1.3 Minor location changes from those indicated may be necessary so that work can conform with the building as constructed, to fit work of other trades or to comply with the rules of authorities having jurisdiction.

3.2 Raceways:

- 3.2.1 Install all wiring in metallic raceway systems including grounding, unless specifically indicated otherwise in other Sections herein or on the Drawings. This shall include all controls wiring, thermostat wiring, occupancy sensor wiring, or any other such controls-voltage or low-voltage wiring – unless specifically indicated otherwise in another part of the Contract Documents.
- 3.2.2 Refer to structural drawings for framed openings for raceways, etc., in floors and roofs. Contractor shall be responsible for locating and providing proper dimensions for all required electrical openings.
- 3.2.3 Layout and install raceways with sufficient clearance to permit proper installation.
- 3.2.4 Install raceways straight and plumb. Squarely cut conduit and properly ream to remove all constriction and burrs before making up joints. Paint exposed threads to retard rusting. Bending of conduit with a pipe tee or vise is prohibited.
- 3.2.5 EMT conduit shall be installed only in interior spaces. EMT shall not be installed in any

BASIC MATERIALS AND METHODS

260100.6

- slabs on or below grade; however, it is permitted in slabs suspended above grade such as in the floors higher than the ground floor in multistory construction. EMT installed in concrete shall have concrete tight fittings.
- 3.2.6 Maximum size of EMT shall be 4". Minimum size shall be ½" unless noted otherwise on the Drawings. EMT shall only be used with cables rated 600 volts or less.
- 3.2.7 Raceways in hazardous areas shall be rigid metal conduit.
- 3.2.8 Raceways below grade shall be rigid metal conduit or PVC unless noted otherwise. Raceways in concrete slabs-on-grade shall be rigid metal conduit or PVC unless noted otherwise. Raceways in slabs supported above grade (such as the floor slab of the second or higher story of construction) shall be rigid metal conduit or electrical metallic tubing only unless noted otherwise. Raceways penetrating grade or concrete slab-on-grade shall be rigid metal conduit only (conduit and threads shall extend above finished grade or top of slab or contractor shall provide any materials and labor necessary to comply with this requirement); coordinate exact elevations with elevations indicated in contract documents for top of slab. Conduit penetrations of slabs supported above grade shall be rigid metal conduit or electrical metallic tubing only unless noted otherwise. If PVC is used, all elbows in any location and all risers through grade or slab shall be rigid metal conduit only. All rigid metal conduit provided below grade or inside slab-on-grade shall be protected by two coats of bitumastic to above finished grade or to above finished slab. PVC elbows shall not be permitted. PVC slab or grade penetrations shall not be permitted. All exposed conduit in wet or damp locations shall be rigid galvanized steel conduit only (no exception for painting). If not complied with, no additional compensation will be provided to the contractor for the correction of these or other contract requirements.
- 3.2.9 Rigid metal conduit installed in concrete or underground shall be made watertight by applying compound to the threads or using concrete-tight thread-less fittings when installed in concrete, or using rain-tight threadless fittings when installed on outside walls or in wet locations.
- 3.2.10 Rigid metal conduit installed underground or in slab-on-grade shall be painted with two coats of alkali and acid resistant paint such as bitumastic or equal. Coating shall not be diluted.
- 3.2.11 PVC coated rigid metal conduit may be provided as an option in lieu of the two coats of the alkali and acid resistant paint. The joints shall be protected with PVC tape applied after the joints are made. Tools for the purpose shall be used in making up the joints so as not to damage the coating.
- 3.2.12 All raceways shall be provided in concealed locations, only, unless noted otherwise on the Drawings or in the Project Manual.
- 3.2.13 Conduit may be exposed in equipment rooms, vertical chases, mechanical and electrical rooms, other similar spaces not normally habitable or exposed to public view, and where electrical drawings specifically note "exposed conduit."

BASIC MATERIALS AND METHODS

260100.7

- 3.2.14 Raceways shall be supported by approved types of galvanized wall brackets, ceiling trapeze with threaded rod support, or pipe straps. Conduit shall not be supported at any point by wire or wire clips.
- 3.2.15 Job cut threads shall be wire brushed, degreased and given two coats of cold galvanizing paint before assembly and a touch-up coat as necessary after assembly.
- 3.2.16 Conduit in masonry shall be installed ahead of the masons.
- 3.2.17 Cutting of chases is prohibited.
- 3.2.18 Conduit shall be closed during construction to prevent entrance of foreign material.
- 3.2.19 Flexible metal conduit shall be installed only in dry locations and shall be of nominal trade size not less than ½" or as permitted by "Exceptions" in NEC. Flexible metal conduit shall be used with UL approved type fittings. Flexible metal conduit shall be used as a raceway for motors, transformers, or other equipment that may be provided with an adjustable mounting or vibration base.
- 3.2.20 Liquid-tight flexible metal conduit shall be installed in wet locations, in both concealed and exposed work, where required for protection from liquids, vapors or solids. Liquid-tight flexible metal conduit shall be used as a raceway for motors, transformers or other equipment that may be provided with an adjustable mounting or vibration base.
- 3.2.21 Surface raceway and fittings shall be installed in dry locations.
- 3.2.22 Wireways and wireway fittings shall be used for exposed work and when installed outdoors or in wet locations shall be approved weatherproof construction.
- 3.2.23 Expansion fittings shall be provided for raceways to compensate for thermal expansion and contraction and at building expansion joints. Bonding jumpers shall be provided for electrical continuity of the raceway system at the expansion fittings.
- 3.2.24 Bushings shall be provided at the end of a conduit to protect the insulation of the conductor. Provide grounding bushings for metal raceways, boxes, cabinets to insure that all metallic surfaces are effectively grounded. Metallic raceway may be bonded to cabinets, boxes and panelboards by double locknut and bushing to ensure the metallic parts are all effectively grounded.
- 3.2.25 Conduit or raceways through which moisture may enter and contact energized live parts shall be sealed or plugged at either or both ends with conduit seals where portions of an interior raceway system are exposed to widely different temperatures, e.g., circulation of air from a warmer to a cooler section through the raceway shall be prevented by conduit seals.
- 3.2.26 Install pull boxes in conduit at intervals of 200 feet or less except when these intervals will place the pull box cover in a finished floor area or non-accessible place, the interval may be extended to a maximum distance of 450 feet. Request for each deviation or extension of interval shall be made and approval granted by the Engineer before

BASIC MATERIALS AND METHODS

260100.8

proceeding with the installation.

3.2.27 Underground Work:

3.2.27.1 Excavation and backfilling for underground conduit systems shall be in accordance with Division 2 "Sitework" and Division 26 Section on "Excavation and Backfill." Minimum cover for exterior underground conduit shall be 30" over conduit unless otherwise noted on the Drawings. Ductbanks, if installed, shall be provided as necessary to ensure drainage.

3.2.27.2 All underground piping and utilities shall have metalized warning tape installed above the pipe or line that identifies the specific system buried below. Tape shall consist of a minimum 3.5 mil solid foil core encased in a protective plastic jacket (total thickness 5.5 mils) and be 6" wide with black lettering imprinted on a color coded background that conforms to APWA color code specifications. Tape shall be continuously printed with "CAUTION" in large bold letters. A second printed line shall indicate the type of cable beneath (i.e. 12 kV, 480 V, 208V, telephone, etc). Use yellow tape for electric and green for telephone. Tape shall be installed from 18" to 30" above the pipe and in no case less than 6" below grade.

3.2.28 Conduit Installed in Concrete:

3.2.28.1 Conform to applicable portion of Section 703 of ACI Standard Code for reinforced concrete.

3.2.28.2 Locate conduits in center third of concrete slab thickness. Outside conduit diameter not to exceed 1/3 concrete slab thickness. Install no conduit in concrete slabs of less than 3" thick.

3.2.28.3 Install no conduit in terrazzo flooring.

3.2.28.4 Conduits in concrete slabs shall not cross at an angle of less than 45 degrees.

3.2.28.5 Conduits shall not pass through beams except when shown on the Drawings.

3.2.28.6 Space vertical installation of conduit through concrete slabs not closer than three diameter on center.

3.2.29 Cleaning: Clean conduit systems by wire rat brush and mandrel.

3.3 Boxes:

3.3.1 Attach boxes to concrete formwork, or to other surrounding building material. Provide additional junction and pull boxes where injury to insulation or deformation of wire would occur due to excessive pulling resistance. When several feeders pass through a common pull box, tag each feeder separately, indicating electrical characteristics and destination.

3.3.1.1 Boxes shall be accurately located. Consult Architectural plans for dimensions.

BASIC MATERIALS AND METHODS

260100.9

- 3.3.1.2 Mount boxes in the course nearest to the height specified when installed in finished block, brick or tile walls.
- 3.3.2 Recessed Installation: Boxes and covers shall be installed so that the covers are flush with the finished surfaces. Boxes in masonry or tile construction shall have masonry boxes or boxes with square cut tile covers. Do not cut concrete block through its entirety in order to accommodate any type box. "Handy" boxes shall not be used.
- 3.3.3 Boxes in Partitions: Through type boxes are not permitted except where shown on electrical drawings. Recessed outlet boxes, cabinets, consoles, etc., when shown located back-to-back shall be provided with ½" fiberglass insulation between the boxes.
- 3.3.4 Lighting Outlets:
- 3.3.4.1 Coordinate location of electrical outlets with architectural features of the building and with the equipment of other trades.
- 3.3.4.2 Paneled or patterned ceilings shall have outlets located according to the ceiling pattern.
- 3.3.4.3 Boxes mounted between bar joists or "T" bars shall be supported from two bars or joists.
- 3.3.4.4 Mounting heights of wall lighting outlets shall be as listed below except when otherwise indicated on the Drawings.

General - 7'6" above the finished floor.

Over lavatories - 6" to center above top of mirror.

Over doors - 18" to center above door.

Height may be adjusted to allow wall blocks to be cut to nearest edge.

3.4 Wiring:

- 3.4.1 General: Conductors shall not be installed until conduit system is complete. Bending radius of insulated wire or cable shall not be less than the minimum recommended by wire or cable manufacturer. Maximum pulling tension of any wire or cable shall not exceed manufacturer's recommended values. Do not injure insulation while installing wire in conduits.
- 3.4.2 Color Coding: Conductors of size No. 6 and smaller shall have color coded insulation. Sizes larger than No. 6 may have color coded insulation or color coded tape for the purpose. Should tape be used, cover not less than 2" of conductor within the enclosure.
- 3.4.3 Switchleg conductors shall be a color other than white, green or the phase or line color.
- 3.4.4 Green shall be used only as the grounding conductor. White or gray shall be used only as the grounded conductor which is the neutral conductor. The neutral shall not be used as the grounding conductor and the grounding conductor shall not be used as the neutral.

BASIC MATERIALS AND METHODS

260100.10

- 3.4.5 Intercommunications, communications, temperature control, and fire alarm conductors shall be color coded or permanently tagged for identity. If tagged, conductor colors shall not include white, gray or green base color or stripes. Colors shall comply with the Insulated Power Cable Engineers Association (IPCEA) method K-2.
- 3.4.6 Conductors in Parallel: Conductors connected in parallel (electrically joined at both ends to form a single conductor) shall be of the same length, of the same conductor material, the same circular-mil area, the same insulation type and terminate in the same manner. Where installed in separate raceways or cables, the raceways or cables shall have the same physical characteristics.
- 3.4.7 Wiring in motor control, switchboards, panelboards, junction cabinets, etc., shall be neatly formed to present a neat and orderly appearance.
- 3.4.8 A single neutral shall not be shared by more than one load on different phases of power as part of a multiwire branch circuit. If a multiwire branch circuit supplies only one individual load then only one neutral shall be required. Unless they supply only one individual load, all branch circuits shall have a separate and dedicated grounded (neutral) conductor. Provide materials and labor necessary to increase the conduit sizes from that which is specified, as necessary, to accommodate pulling these additional dedicated grounded (neutral) conductors. The Contractors shall not provide two-pole circuit breakers, three-pole circuit breakers, or separate circuit breakers with breaker ties in order to avoid providing these above-required dedicated grounded (neutral) conductors (as would otherwise be required for compliance with NEC 210.4 (B) (2008 Ed.) for more than one load being supplied by a multiwire branch circuit if the above-required additional neutrals were not provided.)
- 3.4.9 The minimum size of wire shall be No. 12 AWG.
- 3.4.10 Interconnections of control wiring shall be on identified numbered terminal strips.
- 3.4.11 Splices: Splices shall be permitted in junction boxes, outlet boxes of other permanently accessible locations where permitted by applicable codes. Conductors No. 6 or smaller shall be spliced with devices approved by Underwriters Laboratories, Inc., as splicing connectors. Splices in conductors larger than No. 6 shall be accomplished with devices approved by Underwriters Laboratories as pressure cable connectors.
- 3.4.12 Splices made in underground boxes or wet locations shall be made with a commercial, UL approved cast resin splicing kit.
- 3.5 Wire Pulling Lubrication: Shall be used when any wire is pulled by mechanical means. Wire and cable shall be carefully handled during installation. Soap flakes or vegetable soaps shall not be used for lubrication.
- 3.6 Equipment Identification: Secure tags and markers to each item of equipment. Secure all cabinet nameplates with self-tapping screws or machine screws and nuts. Do not rely on adhesive mounting. Name tags for equipment operated from normal power shall be "Black." Name tags for equipment operated from emergency power shall be "Red."

BASIC MATERIALS AND METHODS

260100.11

- 3.7 Sleeves, Inserts and Supports:
- 3.7.1 Equipment Supports: Concrete bases and structural steel to support this Division's equipment and raceways, and not specifically shown on Structural or Architectural Drawings shall be furnished by Contractor whose equipment or raceways is to be supported. Provide a raised reinforced 4" concrete base for all floor supported equipment, or as indicated on the Drawings.
- 3.7.2 Setting in Concrete: Place all inserts in concrete forms prior to time concrete is poured. If additional inserts are required in existing concrete work, use self-drilling screw anchors.
- 3.7.3 Support Spacing: Comply with codes and regulations referenced earlier and as follows:
- 3.7.3.1 Support no electrical work from piping, ductwork, etc. Where metal decking is used, provide supports independent of decking so that loads will not be transferred to decking. Drill through decking and secure supports to concrete slab.
- 3.7.3.2 Vertical conduit inside building shall be supported at each floor level and at 10'0" intervals.
- 3.7.3.3 Support conduit within one foot of changes of direction, and within one foot of each enclosure to which it is connected.
- 3.7.4 Sleeves Through Roofs: Coordinate setting with Division 7. Contractor shall provide penetrations complying with Architectural requirements.
- 3.8 Additional Steel Support Hardware required for the installation of any electrical or other equipment or devices provided shall be provided by the Contractor. Contractor shall provide materials and labor necessary to ensure that all products are rigidly secured to structure pursuant to applicable portions of NEC 300.11. This shall include – but shall not be limited to – providing additional threaded rods, metal framing, and other hardware required to minimize horizontal as well as vertical movement. Means of support shall be clearly indicated and fully described in the submittal for items suspended. Threaded rods shall not be used as sole means of support for suspended raceway unless approved in writing by engineer or unless assembly can be demonstrated to be substantially free from significant horizontal or vertical sway or movement as is required to comply with NEC. Lighting fixtures shall not be supported by threaded rods or chains unless approved in writing by engineer. See Project Manual Section, “Lighting Fixture Supports, Standards and Poles.”
- 3.9 Caulking and Seals:
- 3.9.1 Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases in accordance with Division 7 requirements. Fire stop shall be UL listed and NFPA approved for such service. Completely fill and seal clearances between raceways and openings with the fire stop material. Adhere to manufacturer's installation instructions.

BASIC MATERIALS AND METHODS

260100.12

- 3.9.2 At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight.
- 3.10 Painting:
- 3.10.1 Painting for Division 26 work shall be by the Division 9 finishes contractor and as provided in Division 9 - finishes.
- 3.10.2 The Division 26 Contractor shall be responsible for coordinating with the Division 9 - Finishes Contractor the painting of the materials and equipment of Division 26.
- 3.10.3 Refer to the Finish Schedule on drawings for location and type of paint.
- 3.10.4 NEC Working Space Shall Be Indicated – Areas that pertain to Working Space in Article 110.26 of the NEC shall have yellow striping installed diagonally with stripes being three inches wide and three inches apart. The center of the area shall have the words “Safety Zone” installed with letters at least four inches high. Architect or Engineer shall be consulted for projects in which this area is carpeted, tiled, or otherwise has flooring which is not appropriate for such painting.
- 3.10.5 Finish in areas not listed or otherwise noted shall be black enamel.
- 3.10.6 Hangers, supports, structural steel and equipment that are not factory finished shall be prime coated and finished coated with color to match the area in which it will be located.
- 3.10.7 Electric cabinets, switchboards, panelboards and equipment that are factory finished and have damaged finish shall be touched up to match the factory finish.
- 3.10.8 All surfaces that are to be painted shall be free of rust, scale, oil and grease before prime coat is applied.
- 3.11 Grounding: Ground and bond in accordance with NEC Article 250 and other applicable articles.
- 3.11.1 Provide an equipment grounding conductor which shall be separate from the electrical system neutral conductor. The equipment grounding conductor shall be colored green. It shall be continuous from a connection at the Service Entrance Equipment Ground to all switchboards, distribution and branch panelboards. Equipment grounding conductors shall be provided in all branch circuits serving convenience outlets, receptacles, portable and permanently installed electrical appliances, equipment apparatus and other miscellaneous metal enclosing bodies including light switch boxes normally within contact of personnel. Branch circuit grounding conductors shall be sized in accordance with the National Electrical Code. Connections at panelboards, outlets, equipment and apparatus shall be made in an approved and permanent manner. Resistance to ground shall not exceed 25 ohms.
- 3.11.2 Bond bushings of the raceway system to ground lugs in boxes, cabinets, motors and equipment to assure electrical continuity of all metallic components of the electrical systems. Comply with the requirements of NEC.

BASIC MATERIALS AND METHODS

260100.13

- 3.12 Equipment Backboards: Locate equipment backboards where indicated on the Drawings. Install straight and plumb. Secure to structure using screws, toggle bolts or masonry anchors. DO NOT use plastic or wood plugs in masonry or concrete. Do not install combustible backboards in air handling space, plenums or where prohibited by the local governing authority.
- 3.13 Underground Raceway Markings: Provide monument marker above the ends of any "Stub Out" raceway. See monument marker detail in these Specifications.
- 3.14 Testing:
- 3.14.1 At the completion of the installation of the conductors or cables into the raceway systems, tests shall be conducted by "megger" to ascertain that the insulation for the conductors or cables has not been damaged. Megger test each feeder and branch circuit conductor or cable with an instrument capable of producing approximately 500 volts for conductors or cables insulated with 600 volt insulation.
- 3.14.2 The minimum insulation resistance shall be 100 megohms per 1000 feet of 500 KCMIL conductors or smaller insulated with THW or THWN, and 1,000 megohms per 100 feet of 500 KCMIL conductors or smaller insulated with XHHW or other cross-linked insulation.

END OF SECTION

BASIC MATERIALS AND METHODS

260100.14

SECTION 260101 / CONDUCTOR AND CABLE IDENTIFICATION

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.
- 1.2 This Section is a Division-26 Basic Materials and Methods Section, and is part of each Division-26 Section making reference to or requiring products specified herein.
- 1.3 This Section provides the requirements for identification of grounded conductors (neutral), grounding conductors, ungrounded conductors and terminals.
- 1.4 Grounded Conductor (neutral), Size No. 6 AWG or smaller, shall be identified by a continuous outer finish along its entire length which is the color stated below. Sizes larger than No. 6 AWG shall be identified either by a continuous outer finish along its entire length or at the time of installation by a distinctive marking at its terminations, which is the color stated below.
- 1.5 A continuous white or natural gray covering on a conductor or a termination marking of white or natural gray color shall be used only for the grounded conductor (neutral). See below colors.
- 1.6 Terminals to which a grounded conductor is to be connected shall be substantially white in color or identified by white markings. Other terminals shall be a different, readily distinguishable color, or by markings in different, readily distinguishable colors.
- 1.7 Grounding Conductor Size No. 6 AWG or smaller shall be identified by a continuous green outer finish along its entire length. Sizes larger than No. 6 AWG shall be identified either by a continuous green outer finish along its entire length or at the time of installation by a distinctive green marking at its termination.
- 1.8 Terminals to which grounding conductors are connected shall be green in color.
- 1.9 A continuous green covering on a conductor or a termination marking of green shall be used only for the grounding conductor.
- 1.10 Control wiring and data cables shall be identified by heat shrink sleeves at both ends hot stamped with wire numbers coordinated to wiring diagrams. Adhesively attached Brady tag type markers are specifically forbidden. All terminal boards shall be numbered.

2 PRODUCTS

- 2.1 Comply with the Section 26100, "Basic Materials and Methods."

3 EXECUTION

- 3.1 Identification of conductors shall follow the format set forth herein for the electrical characteristics as indicated:

CONDUCTOR AND CABLE IDENTIFICATION

260101.1

3.1.1 120/240 Volt Single Phase 3 Wire

Neutral	White
Line 1	Black
Line 2	Red
Grounding Conductor	Green

3.1.2 120/208 Volt Three Phase 4 Wire WYE

Neutral	White
Phase A	Black
Phase B	Red
Phase C	Blue
Grounding Conductor	Green

3.1.3 230/240 Volt Three Phase 4 Wire Delta

Neutral	Gray
Phase A	Black
Phase B	Orange (Hi-Leg)
Phase C	Blue
Grounding Conductor	Green

3.1.4 277/480 Volt Three Phase 4 Wire WYE

Neutral	Gray
Phase A	Brown
Phase B	Orange
Phase C	Yellow
Grounding Conductor	Green with Yellow Stripe (tracer)

3.1.5 Where more than one nominal voltage system exists, provide 1/8" thick engraved phenolic white on black lettered sign on every branch circuit panelboard in the project, new or existing, in compliance with NEC 210.5.

3.2 Communication, temperature control and fire alarm conductors shall be color coded or permanently tagged for identification. The colors shall not include white, gray, or green base colors or stripes (tracers) unless these colors are used on grounded conductors or grounding conductors.

3.3 Colors shall comply with the Insulated Power Cable Engineers Association (IPCEA) Method K-2 chart.

3.4 For direct current (DC) systems, Black shall be negative and Red shall be positive.

3.5 Identification shall be provided at terminations of the conductors and at junction boxes, terminals or cabinets when multi conductors are installed at these locations.

CONDUCTOR AND CABLE IDENTIFICATION

260101.2

- 3.6 Fire Alarm conductors shall conform with the color code specified in the specification section titled, "Fire Detection and Alarm System."
- 3.6.1 Tag or label each conductor with zone numbers at each end and in each junction or pull box in the raceway system. Example Zone 1, Zone 2 etc. Each conductor shall have in addition to the zone number a terminal number at each end.

END OF SECTION

CONDUCTOR AND CABLE IDENTIFICATION

260101.3

SECTION 260103 / GENERAL GROUNDING ELECTRICAL SYSTEMS

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.
- 1.2 This Section is a Division-26 Basic Materials and Methods Section, and is part of each Division-26 Section making reference to or requiring products specified herein.

2 PRODUCTS

- 2.1 Ground rods shall be copperclad 3/4"x 10 feet.
- 2.2 Grounding conductors shall be copper with green insulation.

3 EXECUTION

- 3.1 Grounding Conductor Size No. 6 AWG or smaller shall be identified by a continuous green outer finish along its entire length. Sizes larger than No. 6 AWG shall be identified by either a continuous green outer finish along its entire length or at the time of installation by a distinctive green marking at its termination.
- 3.2 Provide an equipment grounding conductor which shall be separate from the electrical system neutral conductor. The equipment grounding conductor shall be colored green. It shall be continuous from a connection at the Service Entrance Equipment Ground to all switchboards, Motor Control Centers; distribution and branch panelboards. Equipment grounding conductors shall be provided in all branch circuits. Branch circuit grounding conductors shall be sized in accordance with the National Electric Code. Connections at panelboards, outlets, equipment apparatus shall be made in an approved and permanent manner. Electrical raceway shall not be used as a grounding conductor.
- 3.3 All ground connections shall be made on surfaces which have been cleaned of all paint, dirt, oil, etc., so that connections are bare metal to bare metal contact. All ground connections shall be tight, and shall be made with U.L. listed grounding devices fittings, bushings, etc.
- 3.4 Bond all metallic piping and structural systems to the service entrance ground bus with bonding jumpers the same size as the service grounding electrode conductor.
- 3.5 Grounding electrodes shall be driven as required. Where rock is encountered, grounding plates may be used in lieu of grounding rods.
- 3.6 All equipment enclosures, motor and transformer frames, conduits systems, cable armor, and similar items shall be grounded.
- 3.7 Exposed connections shall be made by means of approved grounding clamps. Exposed connections between different metals shall be sealed with No-Oxide Paint Grade A or approved equal. All connections which are buried, concealed in concrete, or otherwise

GENERAL GROUNDING ELECTRICAL SYSTEMS

260103.1

- not accessible for inspection after construction shall be made by welding process equal to Cadweld.
- 3.8 The Contractor shall exercise care to insure good continuous ground, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.
- 3.9 Provide a #6 ground conductor from each telephone terminal cabinet to the main telephone terminal board.
- 3.10 Multiple conductors in a single lug are not permitted. Each grounding conductor shall terminate in its own terminal lug.
- 3.11 Provide a ground conductor from each transformer location to the building ground system. This conductor shall be used to ground the secondary side neutral, case and core in accord with grounding requirements for a separately derived system.
- 3.12 Testing: The contractor shall test the ground resistance of the system. All test equipment shall be provided by the Contractor and approved by the Engineer. Dry season resistance of the system shall not exceed 5 ohms. If such resistance cannot be obtained with the system as shown, the Contractor shall provide additional grounding as directed by the Engineer without additional payment.

END OF SECTION

GENERAL GROUNDING ELECTRICAL SYSTEMS

260103.2

SECTION 260112 / FUSES 600 VOLTS AND BELOW1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Acceptable Producers: Bussman, General Electric, Gould & Brush Fuse.
- 2.2 General: Products listed herein are common to various Divisions and Specification Sections for this project and as shown on this project's Drawings.
- 2.3 All fuses furnished shall be by the same producer.
- 2.4 Voltage Rating:
 - 2.4.1 Provide 600 volt fuses for 277/480 volt systems.
 - 2.4.2 Provide 250 volt fuses for 120, 208 and 240 volt systems.
- 2.5 Ampere Ratings: Ampere ratings of fuses shall be as indicated on the Drawings.
- 2.6 Interrupting Ratings: Interrupting ratings of fuses shall be as indicated on the Drawings.
- 2.7 Current Limitation: Current limiting fuses shall be provided where indicated by the symbol C/L on the Drawings.
- 2.8 Rejection Fuse Clips: Provide fuse with rejection feature for switches required to have the rejection feature as indicated on the Drawings.
- 2.9 Class of Fuses: Provide fuses of Class J, K, L or R. Class H fuses shall be provided only if indicated on the Drawings.

3 EXECUTION

- 3.1 Coordinate fuse type and ampacity with fuse holder.
- 3.2 Provide one set of fuses of each type and ampacity for spares. Voltage to correspond with circuit to be protected.

END OF SECTION

FUSES 600 VOLTS AND BELOW

260112.1

SECTION 260120 / CIRCUIT BREAKER ENCLOSURES1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Acceptable Producers: ABB, Cutler-Hammer, General Electric, Square D, and Siemens ITE or approved equal. Products shall be furnished by one producer.
- 2.2 General: Products listed herein may be common to various of the Divisions and Specification Sections of the project.
- 2.3 Enclosures shall be NEMA type with factory finish baked enamel or as indicated on drawings.
- 2.4 NEMA 1 enclosures shall be furnished with knockouts and fabricated of steel.
- 2.5 NEMA 3R enclosures, rainproof shall be furnished with raintight hubs sized for the conduit as shown on the Drawings. Enclosures shall be fabricated from zinc coated steel.
- 2.6 Provide enclosure with ground bus or terminal and fully insulated neutral bar or terminals.
- 2.7 Circuit breakers are specified in the Sections "Circuit Breakers, Molded Case."

3 EXECUTION

- 3.1 Individual circuit breaker enclosure shall be identified with an engraved laminated plastic legend plate.
- 3.2 Plastic (Dymo) type legend plates shall not be allowed.
- 3.3 Install a wireway for wiring between multiple units. Wireway fill shall not exceed 20% of cross sectional area.
- 3.4 Exterior units shall be in NEMA Type 3R raintight enclosure or as indicated on the Drawings.

END OF SECTION

CIRCUIT BREAKER ENCLOSURES

260120.1

SECTION 260125 / CIRCUIT BREAKERS, MOLDED CASE1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Acceptable Producers: General Electric, Siemens/ITE, Cutler-Hammer, and Square D. Products shall be furnished by one producer.
- 2.2 General: Products listed herein may be common to various Divisions and Specification Sections.
- 2.3 Provide molded case circuit breakers with a minimum AIC rating of 10,000 amperes RMS symmetrical and with higher AIC ratings as indicated on the Drawings. Any circuit breaker provided in an existing panelboard or in an existing switchboard shall have minimum short circuit interrupting ratings (AIC) equal to the highest ratings of any of the existing overcurrent devices in the same panelboard or switchboard at the given voltage of the panelboard or switchboard. All circuit breakers shall be fully rated for the interrupting ratings indicated and shall not be series rated. Every overcurrent device provided shall be UL approved to individually interrupt its rated short circuit current and shall not depend upon operation of another overcurrent device to achieve its rating. Series-rated devices are not acceptable.
- 2.4 Individual circuit breakers shall be safety dead front units in NEMA Type enclosure.
- 2.5 Molded case circuit breakers shall have overcenter, trip free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle indication. All breakers shall be bolt-on type.
- 2.6 Two and three pole circuit breakers shall have a common trip.
- 2.7 Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.
- 2.8 The circuit breaker shall be constructed to accommodate the supply connections at either end.
- 2.9 Circuit breakers provided shall be HACR-type as required by the manufacturers of the equipment supplied; see paragraph 3.1, below.

CIRCUIT BREAKERS, MOLDED CASE

260125.1

- 2.10 Circuit breaker operating handle shall assume a center position when tripped.
- 2.11 Circuit breakers shall be calibrated for operation in an ambient temperature of 40° C.
- 2.12 Provide molded case circuit breakers with shunt trip features where indicated on the Drawings.

3 EXECUTION

- 3.1 Contractor shall coordinate exact electrical requirements and circuit breaker types with that which is required by manufacturers of the equipment supplied – as necessary to maintain equipment's UL Listing; coordinate with other divisions of this contract. Contractor shall provide HACR-type circuit breakers as required by manufacturers of equipment supplied. See paragraph 3.2.3 of Section 26005 of the Project Manual.
- 3.2 Provide circuit breakers as specified in the Panelboard Schedules on the Drawings. Ampere ratings and the number of poles are indicated on the Panelboard Schedules.
- 3.3 Circuit breakers shall be suitable for mounting and operating in any position.
- 3.4 Circuit breakers shall be UL listed.
- 3.5 Shunt trip device where required shall operate in conjunction with contact closure of push button, ground fault relay or other pilot device to trip open associated circuit breakers upon command.
- 3.6 Coils of shunt trip device shall be rated continuous duty and shall include interlock arrangement to clear power from coil after operation.
- 3.7 Control Power: Where no other source of control power is indicated, energy to actuate tripping devices through action of pilot device shall be 120 volts, 60 Hz as follows:
 - 3.7.1 120/208 Volt Panelboards: Energy shall be from dedicated branch circuit breaker of panelboard set to trip at not greater than 20 amperes.
 - 3.7.2 277/480 Volt Panelboards: Energy shall be from control power transformer, with secondary voltage of 120 volts, 60 Hz and with primary leads protected by current limiting fuses mounted in plug-in style, dead front fuse block. Locate fuse block within panelboard and locate C.P.T. adjacent to panelboard in protected housing. Connect transformer primary at load side of circuit breaker to be tripped.
 - 3.7.3 Switchboards: Energy shall be as specified above for 277/480 volt panelboards, except locate transformer accessibly within switchboard near fuse block.
 - 3.7.4 Testing: Test all circuit breakers which are rated 200 amps or greater, both main and feeders, using standard tests to verify overcurrent and time delay settings and characteristics. Defective devices shall be replaced and the replacement device tested. All testing shall be performed by and independent electrical testing organization regularly involved in such work. Submit name of testing agency thirty days prior to test and advise

CIRCUIT BREAKERS, MOLDED CASE

260125.2

engineer of test time and date at least two weeks in advance. Submit four copies of test results, including device operating characteristics plotted on log-log time-current paper and operating and maintenance manuals.

END OF SECTION

CIRCUIT BREAKERS, MOLDED CASE

260125.3

SECTION 260155 / RELAYS

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Acceptable Producers: Allen-Bradley, General Electric Co. and Square D.
- 2.2 General: See electrical Drawings, Panelboard Schedules and Control Diagrams for numbers and types of relays required. Relays shall be electrically held, unless indicated otherwise on the Drawings.
- 2.3 Enclosures: Relays may be mounted in panelboards or in NEMA type 1 enclosures adjacent to or above panelboard.
- 2.4 Poles: Required by circuit controlled or as indicated on Drawings.
- 2.5 Ratings: Rated for inductive and resistive load, or as indicated on Drawings.

3 EXECUTION

- 3.1 Mounting: For relays outside panelboards, furnish relays in enclosures. The enclosures shall be mounted on walls to slotted angles or channels with required hardware. Combustible materials for mounting are not permitted.
- 3.2 Controls: Install as indicated on Drawings.

END OF SECTION

RELAYS

260155.1

SECTION 260170 / GENERAL WIRING DEVICES1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Acceptable Producers: Leviton, General Electric, Hubbell, Pass and Seymour, Sierra, Bryant, or Eagle Electric.
- 2.2 General: Devices shall be specification grade. Use white finished devices throughout except as hereinafter noted otherwise. Any color selection shall be approved by Architect prior to ordering. See Electrical Drawings for gang switches, receptacles and notes for special wiring devices. All wiring devices, including dimmer switches, shall be rated for 20A, minimum.
- 2.3 Switches:
 - 2.3.1 Single Pole, 20 amp, 120/277V shall be Hubbell 1221 or approved equal.
 - 2.3.2 Double Pole, 20 amp, 120/277V shall be Hubbell 1222 or approved equal.
 - 2.3.3 Three-Way, 20 amp, 120/277V shall be Hubbell 1223 or approved equal.
 - 2.3.4 Four-Way, 20 amp, 120/277V shall be Hubbell 1224 or approved equal.
 - 2.3.5 Single Pole, 30 amp, 120/277V shall be Hubbell 3031 or approved equal.
 - 2.3.6 Lock Type, same Hubbell catalog numbers above except add suffix "L". Furnish associated key with each lock type device.
 - 2.3.7 Lighted Handle devices with handle lighted in "OFF" position shall be same catalog numbers as above or approved equals except suffixes shall be "IL" for 120V and "IL7" for 277V.
 - 2.3.8 Lighted Handle, toggle type devices with handle lighted "ON" position shall be same catalog numbers as above or approved equals except suffixes shall be "PL" for 120V and "PL7" for 277V.
 - 2.3.9 Narrow Wood or Metal Jambs and Partitions: Devices for installation in narrow wood or metal jambs and partitions shall be Pass and Seymour catalog numbers ACD201-I,

GENERAL WIRING DEVICES

260170.1

ACD203-I or approved equal.

- 2.3.10 20 Ampere Interchangeable Switches: Provide pass and Seymour No. ACD201-I or approved equal, with identification engraved on cover plate. Engraving shall be 1/8" block letters, black enamel filled.
- 2.3.11 Pilot Light Switches: Provide switches with 120 volts pilot light as indicated on the Drawings. Mount switch and pilot light separately but in common cover plate. Pilot light shall be "ON" when switch is "ON".
- 2.3.12 Vaporproof and Weatherproof Switches: Provide standard tumbler switches in cast boxes with gasketed covers and operating handle. Switches shall be Pass and Seymour No. 4521 or approved equal.
- 2.4 Receptacles:
- 2.4.1 Catalog numbers indicated below are for Hubbell devices. Hubbell catalog numbers are used to give a standard for bidding purposes. However, approved equals will be accepted as indicated in other sections of these specifications.

Where indicated on the Drawings, the following suffixes shall be added to the Hubbell catalog numbers depending on the required color finish:

I	Ivory
R	Red
GY	Grey
WHI	White

No suffix indicates black or brown color finish. Add prefix IG to indicate isolated ground devices. Add prefix GF to indicate ground fault interrupting devices.

2.4.2 Single Receptacle Devices:

20 amp, 2 pole, 3 wire, 125V, NEMA 5-20R Hubbell #5361
 30 amp, 2 pole, 3 wire, 125V, NEMA 5-30R Hubbell #9308
 50 amp, 2 pole, 3 wire, 125V, NEMA 5-50R Hubbell #9360
 20 amp, 2 pole, 3 wire, 250V, NEMA 6-20R Hubbell #5461
 30 amp, 2 pole, 3 wire, 250V, NEMA 6-30R Hubbell #9330
 50 amp, 2 pole, 3 wire, 250V, NEMA 6-50R Hubbell #9367
 30 amp, 2 pole, 3 wire, 277V, NEMA 7-30R Hubbell #9315
 50 amp, 2 pole, 3 wire, 277V, NEMA 7-50R Hubbell #9365
 20 amp, 3 pole, 4 wire, 125/250V, NEMA 14-20R Hubbell #8410
 30 amp, 3 pole, 4 wire, 125/250V, NEMA 14-30R Hubbell #9430
 50 amp, 3 pole, 4 wire, 125/250V, NEMA 14-50R Hubbell #9450
 60 amp, 3 pole, 4 wire, 125/250V, NEMA 14-60R Hubbell #9460
 20 amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-20R Hubbell #8420
 30 amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-30R Hubbell #8430
 50 amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-50R Hubbell #8450
 60 amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA 15-60R Hubbell #8460

GENERAL WIRING DEVICES

260170.2

2.4.3 Duplex Receptacle Devices:

- 20 amp, 2 pole, 3 wire, 125V, NEMA 5-20R Hubbell #5362
- 20 amp, 2 pole, 3 wire, 250V, NEMA 6-20R Hubbell #5462
- 20 amp, 2 pole, 3 wire, 125V, NEMA 5-20R One boss, 250V,
NEMA 6-20R second boss Hubbell #5492

2.4.4 Locking Type Devices:

- 20 amp, 2 pole, 3 wire, 125V, NEMA L5-20R Hubbell #2310
- 30 amp, 2 pole, 3 wire, 125V, NEMA L5-30R Hubbell #2610
- 20 amp, 2 pole, 3 wire, 250V, NEMA L6-20R Hubbell #2320
- 30 amp, 2 pole, 3 wire, 250V, NEMA L6-30R Hubbell #2620
- 20 amp, 2 pole, 3 wire, 277V, NEMA L7-20R Hubbell #2330
- 30 amp, 2 pole, 3 wire, 277V, NEMA L7-30R Hubbell #2630
- 20 amp, 2 pole, 3 wire, 480V, NEMA L8-20R Hubbell #2340
- 30 amp, 2 pole, 3 wire, 480V, NEMA L8-30R Hubbell #2640
- 20 amp, 3 pole, 4 wire, 125/250V, NEMA L14-20R Hubbell #2410
- 30 amp, 3 pole, 4 wire, 125/250V, NEMA L14-30R Hubbell #2710
- 20 amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA L15-20R Hubbell #2420
- 30 amp, 3 pole, 4 wire, 250V, 3PH, No Neutral NEMA L15-30R Hubbell #2720
- 20 amp, 3 pole, 4 wire, 480V, 3PH, No Neutral NEMA L16-20R Hubbell #2430
- 30 amp, 3 pole, 4 wire, 480V, 3PH, No Neutral NEMA L16-30R Hubbell #2730
- 20 amp, 4 pole, 5 wire, 120/208V, 3PH, NEMA L21-20R Hubbell #2510
- 30 amp, 4 pole, 5 wire, 120/208V, 3PH, NEMA L21-30R Hubbell #2810
- 20 amp, 4 pole, 5 wire, 277/480V, 3PH, NEMA L22-20R Hubbell #2520
- 30 amp, 4 pole, 5 wire, 277/480V, 3PH, NEMA L22-30R Hubbell #2820

2.4.5 Weatherproof receptacles shall be installed in flush weatherproof box with cast gasketed cover and self-closing spring door.

2.5 Miscellaneous Devices:

- 2.5.1 Pilot light shall be flush mounting, 7.5 watt, 125 volt unit with red jewel. Provide with stainless steel plate.
- 2.5.2 Clock outlets shall be single, 15 ampere, grounded 125 volt, with flush mounted stainless steel cover plate and clock hanger. Outlet shall be recessed for attachment plug.
- 2.5.3 Vaporproof or weatherproof pilot lights shall be flush mounted with bull's eye in gasketed cast cover.
- 2.6 Plates: Except as noted below, all wiring device plates shall be nylon or fiberglass reinforced with smooth white finish. Any color selections shall be approved by Architect prior to ordering.
- 2.6.1 Exposed wiring devices shall be provided with galvanized steel plates with rounded corners.

GENERAL WIRING DEVICES

260170.3

- 2.6.2 Vaporproof and weatherproof devices shall be provided with cast covers with galvanized or cadmium finish.
- 2.6.3 Unless noted otherwise in the Contract Documents, floor outlet cover plates and raceways shall be satin bronze or chrome plated.
- 2.6.4 Boxes in which no devices are installed shall be equipped with blank plates.

3 EXECUTION

- 3.1 Outlet box heights shall be considered to be measured to the center-line of the box unless noted otherwise. Unless noted otherwise, light switches shall be provided at one of the following elevations: if the switch is in an area which is required to be compliant with the Accessibility requirements for the Americans with Disabilities Act and if it is above a counter-top or other such permanent obstruction which would prevent the close approach of a wheelchair, then the switch shall be located at an elevation of 45-1/2" above the finished floor; and otherwise, the switch shall be at an elevation of 47-1/2" above the finished floor or grade.
- 3.2 Determine door swings from architectural documents before installing room switch boxes. Install switches on latch side of door.
- 3.3 Contractor shall provide materials and labor necessary to ensure that all spaces in buildings which are larger than 5,000 square feet are provided with occupancy sensors or automatic lighting controls system for the occupancy-sensed or scheduled control, respectively, of all lighting fixtures provided under this contract except for the applicable exceptions specified in the Florida Building Code, as is required by the Florida Building Code. Some of these exceptions in the Florida Building Code are where lighting is designated for 24-hour illumination, where lighting is for security, or where lighting is for areas where automatic control might be dangerous such as in mechanical, electrical, or janitor rooms.
- 3.4 Provide ground wire (#12 AWG green) in each conduit in addition to phase and neutral wires. Ground wires shall interconnect equipment grounds, receptacle grounds, outlets and exposed equipment conductive surfaces with ground bars in panelboards.
- 3.5 Furnish template for receptacles, switches and other cutouts in casework to the Millwork supplier.
- 3.6 Where switches are located in tile wall finish, install them in tile, varying standard mounting height if necessary. Do not mount over 48" above finished floor unless so indicated on the Drawings.
- 3.7 Where several rows of lights are to be controlled, the switch nearest the door shall control the row nearest the interior wall, and the switch furthest from the door shall control the row furthest from the interior wall.
- 3.8 Receptacles Under Any Cooking Hoods shall be provided with all materials and labor

GENERAL WIRING DEVICES

260170.4

- necessary to automatically disconnect power to these receptacles upon activation of automatic fire suppression system if any hoods or fire suppression systems are utilized for this project (as is required by the Florida Building Code). Coordinate these exact requirements with the requirements of the manufacturers of all Division 15 materials for hoods and fire suppression equipment if any of these systems are utilized.
- 3.9 Switches that control remote outlets, fans, etc., shall have engraved plastic name tags indicating the outlets, fans, etc. that are controlled.
- 3.10 A Special Receptacle shall be provided in any mechanical room in which coils are located, unless such a receptacle is found to be existing to remain in that room. This receptacle shall be a NEMA 6-20R receptacle supplied with 208V power, and it shall be located near the door into the room and within 50 feet of any coils. Unless stated otherwise elsewhere in the Contract Documents, provide materials and labor necessary to supply these receptacles from the nearest available power sources with sufficient capacity. Coordinate the exact requirements with field conditions, if coils or air handlers with coils are added to an existing building.
- 3.11 Receptacle Outlets: Mounting heights for receptacle outlets shall be 18" above finished floor or as indicated on the Drawings.
- 3.12 Miscellaneous Outlets:
- 3.12.1 Install clock outlets 96" above finished floor or as indicated on the Drawings.
- 3.12.2 Install outlets for equipment as required by the particular item. Verify that the plug provided with the equipment is compatible with the receptacle installed.
- 3.13 Wiring Devices and Plates: Wiring devices shall be rigidly installed properly aligned and plumb with wall and floor lines. A device plate shall be furnished for each device. Plates shall be installed with all four edges in continuous contact with the finish. Plates shall not support the wiring devices. Gaskets shall be installed where necessary to insure watertight and vapor tight construction.

END OF SECTION

GENERAL WIRING DEVICES

260170.5

SECTION 260215 / EMERGENCY LIGHTING, BATTERY INVERTER UNITS1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division - 26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Acceptable Producers: Bodine Company, Chloride, Emergi-Lite, or approved equal.
- 2.2 General: Units shall be UL listed for installation as an integral part of the lighting fixture or UL listed for retrofit field installation. Build and test units to comply with applicable NEMA, ANSI, IEEE and UL Standards.
- 2.3 Units shall provide power to a lamp or lamps for a period of 90 minutes as prescribed in UL Standard 924. Minimum light output shall be 900 lumens.
- 2.4 Battery: Inverter units shall be provided with nickel cadmium, maintenance free, rechargeable type batteries unless otherwise indicated.
- 2.5 Guarantee: Battery guarantee shall be for a period of five (5) years.
- 2.6 Inverter units shall be designed for operation in an ambient temperature of 32°F to 130°F.
- 2.7 Charger: Inverter units shall be provided with a constant current, solid state charger to return the battery to full charge within 24 hours after discharging and maintain it at that level. The charger shall have dual voltage input 120 or 277 volts, 60 hertz.
- 2.8 Control: Inverter units shall be equipped with electronic circuitry, inverter ballast and transfer switch. A charging indicator light shall be provided as well as a test switch to simulate normal power failure.
- 2.9 In the event of a prolonged power failure, an automatic low-end-cut-off shall be provided to prevent overdischarge of the batteries.

3 EXECUTION

- 3.1 Units shall be installed in accordance with manufacturer's recommendations.
- 3.2 A lighting emergency battery inverter pack shall not be provided in a location which is not accessible with a standard 8 foot tall step ladder. If any emergency battery inverter packs are indicated to be in such locations, the Contractors shall provide materials and

EMERGENCY LIGHTING, BATTERY INVERTER UNITS

260215.1

labor necessary to provide remote-mounted emergency battery inverter packs in locations which are accessible with only a standard 8 foot step ladder or with no ladder at all. This shall include – but shall no be limited to – providing additional conduit, conductors, junction boxes, different emergency battery inverter packs suitable for the remote locations chosen, and any other materials or labor necessary to ensure that the emergency battery inverter packs provided comply with this requirement.

3.3 See Section "Lighting Fixture Schedule".

END OF SECTION

EMERGENCY LIGHTING, BATTERY INVERTER UNITS

260215.2

SECTION 260521 / LIGHTING FIXTURES

1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals:
 - 1.3.1 Submit in brochure form, catalog sheet or cuts of all lighting fixtures. Mark each sheet to match "type" number as specified in Fixture Schedule on the Drawings. Fabricate no fixtures until approval of submittals and catalog cuts have been made.
 - 1.3.2 Fixtures described do not include all stem hangers, frames and other necessary accessories. At each location, provide lighting fixture specified and all accessories necessary for proper installation and operation.
 - 1.3.3 Provide lighting fixtures complete with lamps in accordance with the Fixture Schedule on the Drawings.

2 PRODUCTS

- 2.1 Acceptable Producers: Ballasts produced by Advance, MagneTek, Osram, or approved equal are acceptable; and lamps may be produced by Phillips, Osram, or Sylvania. See Lighting Fixture Schedule on the Drawings for producers of lighting fixtures.
- 2.2 Ballasts:
 - 2.2.1 Ballasts shall be electronic and high frequency (at least 20 KHz). Ballasts for 4' fluorescent lamps shall be designed specifically for use with 265mA T8 lamps. Compact fluorescent ballasts shall illuminate lamps immediately with no noticeable delay.
 - 2.2.2 Ballasts shall be UL listed (class P) with a class A sound rating, and they shall be CBM certified by ETL. Ballasts shall be the energy saving type and shall have a minimum starting temperature of +50°F. Ballasts shall be serviceable while fixtures are in their normally installed position and shall not be mounted to removable reflectors or wireway covers.
 - 2.2.3 Ballasts shall produce less than 10% current Total Harmonic Distortion (THD) and shall operate at a power factor of at least 90%. Ballasts shall be programmed-rapid-start type.
 - 2.2.4 Ballasts shall be capable of operating two, three, or four T8 lamps.
 - 2.2.5 Qualifying manufacturers shall have been manufacturing electronic fluorescent ballasts for a minimum of five years with a satisfactory performance record. Ballasts shall be warranted by the manufacturer for a minimum of three years.

LIGHTING FIXTURES

260521.1

- 2.2.6 Ballasts shall be manufactured by Advance Transformer Company, Sylvania, GE, or approved equal.
- 2.3 Automatic Resetting Thermal Protectors: Furnish with each fluorescent ballast to provide protection against damage.
- 2.4 Fixtures: See Lighting Fixture Schedule in the drawings.
- 2.5 Fixture Wire: Type SF-1, SF-2, TF, TFF, TFN, TFFN or other approved wire.
- 2.6 Gasket: Provide gaskets on all lenses to prevent light leaks. Provide gaskets on all fixtures located in damp and wet locations.
- 2.7 Plaster Frames: Furnish with all fixtures installed in stucco or plaster surfaces.
- 2.8 Plastic Accessories: Use 100% clear virgin methyl methacrylate. Lenses shall be male conical prismatic type, with minimum thickness of .125 inch.
- 2.9 Lenses and Diffusers: Incandescent fixture lenses and diffusers shall be tempered glass, unless scheduled otherwise.
- 2.10 Fuses, if provided, shall be GLR type and not the in-line style.
- 2.11 Low Temperature Ratings shall be provided for all lighting fixtures which are indicated to be located outside. This shall include the ratings for all fixture assembly components including lamp, ballast, and emergency battery inverter unit, if specified.
- 2.12 Sloped-Ceiling Adapters (whenever available for a fixture type as a standard option and unless stated otherwise on the Drawings) shall be provided in all locations where electrical drawings indicate lighting fixtures being installed in ceilings which are not flat. Refer to architectural documents for the locations of all sloped ceilings. Any ceilings with less than 2° (from horizontal) rise in elevation – in all directions – shall be considered to be flat for the purposes of this section of the project manual. Any ceilings with 2° or more rise in elevation shall be considered to not be flat.
- 2.13 Lamps: Fluorescent lamps shall be 4-foot, rapid-start, 32 watt, 265mA, T-8 Octron with 4100K color temperature and minimum Color Rendering Index (CRI) of 85, unless otherwise noted in the Fixture Schedule on the Drawings. Lamps shall be Phillips, Sylvania, GE, or approved equal. Lamps shall have a rated life of 30,000 hours at 3 hours per start and 35,000 hours at 12 hours per start. Incandescent lamps shall be inside-frosted, long life unless noted otherwise. Incandescent lamps shall be rated 130 volts.
- 2.14 Lamp Sockets:
- 2.14.1 Fluorescent: Lampholder contacts shall be the biting edge type or phosphorous-bronze with silver flash contact surface type. Lampholders for bi-pin lamps, with the exception of those for "U" type lamps, shall be of the telescoping compression type, or the single slot entry type requiring a one-quarter turn of the lamp after insertion.

LIGHTING FIXTURES

260521.2

2.14.2 Incandescent: Lampholder contacts for incandescent lamps shall have porcelain enclosures.

3 EXECUTION

3.1 Where a fixture type is not designated on Electrical Drawings, install the fixture type used in a similar location.

3.2 Locate fixtures to suit architectural detail of area involved. Where located in acoustic ceilings, coordinate placement with architectural reflected ceiling plan, or if such plan is not available, obtain approval of fixture location.

3.3 Fixture Schedule on the Drawings shows type of fixture required. Determine modifications to make fixtures suitable for the ceilings in which they are installed and furnish fixtures adapted to ceiling.

3.4 A lighting ballast shall not be provided in a location which is not accessible with a standard 8 foot tall step ladder. If any ballasts are indicated to be in such locations, the Contractors shall provide materials and labor necessary to provide remote-mounted ballasts in locations which are accessible with only a standard 8 foot step ladder or with no ladder at all. This shall include – but shall not be limited to – providing additional conduit, conductors, junction boxes, different ballasts suitable for the remote locations chosen, and any other materials or labor necessary to ensure that the ballasts provided comply with this requirement.

3.4.1 Ceiling types and elevations are often subject to change late in project design. Verify the types of ceiling construction, vertical clearances, and horizontal clearances before ordering fixture fabrication. Determine that suspension methods, flange arrangements, and fixture depths for fixtures coordinate with ceiling types, their suspension systems, and available vertical and horizontal clearances. This shall include coordination with any existing conditions if necessary. Immediately report in writing to the Engineer any discrepancies discovered. Options and fixture types stated regarding ceiling types as indicated on electrical Drawings shall be considered for bidding purposes only. Contractor is responsible for providing fixture types and options appropriate to accommodate ceiling types and available ceiling spaces specified by Architectural Documents even if electrical drawings indicate options or fixture types for different ceiling types or available ceiling spaces.

3.5 Determine exact inscription for exit signs.

3.6 Interferences: In areas where industrial type fixtures are to be installed, such as equipment rooms, fixtures which are near obstructions such as ducts, large pipes, groups of pipes, etc., are to be suspended so that bottom of the fixture is not higher than bottom of duct, etc. Do not locate outlets until locations of these obstructions are determined. Install conduits and outlets exposed to insure accessibility.

3.7 Protect all fixtures and lamps and replace broken parts including those for temporary lighting system.

LIGHTING FIXTURES

260521.3

- 3.8 Clean all lenses and louvers after all other trades have completed their work in each area; or do not install lenses and louvers before that time.

END OF SECTION

LIGHTING FIXTURES

260521.4

SECTION 260620 / SURGE PROTECTION - SECONDARY1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow. Submittal shall include UL 1449 Listing Classification file indicating level of containment which the device has demonstrated in UL fault current tests.

2 PRODUCTS

- 2.1 Acceptable Producers: Advance Protection Technologies, Siemens TPS, General Electric, Joslyn Mfg. & Supply Co., McGraw-Edison, RTE Corp., Leviton, Wiremold, LEA Dynatech, Intermatic.
- 2.2 General: Units shall be designed for application on systems up to 600 volts, 60 Hz, with the number of phases shown in the Drawings for the equipment where installed. Units shall be UL Listed in accordance with UL 1283 and 1449 (most recent edition officially adopted by UL), including the highest fault current of Section 37.3.
- 2.3 Characteristics: Surge protection device shall prevent power surges and spikes from damaging electrical equipment or system it protects. Unit shall have a maximum continuous operating voltage of not less than 115% of nominal phase-to-neutral operating voltage of equipment protected. TVSS unit shall be marked with a Short Circuit Current Rating (SCCR) which is equal to or greater than that which is indicated in the Contract Documents for the equipment protected; series-rated combinations are prohibited; only fully-rated devices shall be provided. Shall provide line-neutral, line-ground, and neutral-ground modes of protection for Wye (such as 3-phase 4-wire) systems and shall have line-line and line-ground modes of protection in Delta wiring systems. UL 1449 Listed Line Suppressed Voltage Ratings for line-neutral, line-ground, and neutral-ground modes of protection shall not exceed 400V for 208Y/120V equipment and shall not exceed 800V for 480Y/277V equipment. TVSS shall meet or exceed the following surge capacities: 240kA modular for main distribution equipment, 160kA modular for distribution switchboards and panelboards supplied by main distribution equipment, and 120kA non-modular for branch panelboards. TVSS shall have EMI/RFI (Electro-Magnetic Interference/Radio-Frequency Interference) filtering with minimum attenuation of -40dB at 100kHz.
- 2.4 Design: Surge suppressor shall be completely self-contained in metal enclosure and arranged for knockout mounting on panelboards. Provide complete with factory leads.

SURGE PROTECTION - SECONDARY

260620.1

3 EXECUTION

- 3.1 Provide materials and labor necessary to provide Transient Voltage Surge Suppression (TVSS) at the following locations in the electrical system provided under this contract: at service entrance disconnection means (main distribution equipment), at designated panelboards, at all panelboards provided which supply either fluorescent lighting loads or power receptacles adjacent to computer data or phone outlets, and at other locations as indicated on the Drawings. This shall include – but shall not be limited to – providing additional circuit breakers and labor as necessary to ensure that TVSS unit is installed in compliance with manufacturer's instructions and the requirement that unit's conductor lengths be minimized; this shall include labor to relocate circuit breakers and re-label circuit directories as necessary to shorten these conductor lengths by locating TVSS unit as close as possible to connection points. Properly connect to phase conductors and to ground as recommended by the manufacturer.

END OF SECTION

SURGE PROTECTION - SECONDARY

260620.2

SECTION 260770 / DIMMING AND CONTROL1 GENERAL

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

1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.

1.3 Submittals:

1.3.1 Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

1.3.2 Submit wiring diagram indicating the interconnections for the system. Indicate the equipment numbers, terminal numbers and wire numbers. The submittal shall be made prior to the installation of the wiring into the system.

1.4 System Description:

1.4.1 Furnish all material, labor, equipment including conduits, wiring, cables, junction boxes, etc., to provide a complete system as specified herein and as indicated on the Drawings.

1.4.2 It is recognized that the different techniques used by the different equipment manufacturers may require modifications. Such modifications may be requested prior to bid date in accordance with the requirements for "Request for Substitution" in the Section "Electrical/General" of these Specifications. The request will be considered provided the criteria of the Specifications are met in performance. The intent of the Specifications is to provide the necessary equipment for a complete stage lighting system.

2 PRODUCTS

2.1 General: Provide products by the stage lighting and control equipment manufacturer indicated on the drawings and specifications. The stage lighting and control equipment specified is called out in terms of products as manufactured by Colortran, Inc. This apparatus is fully catalogued and described with complete technical data available from the manufacturer.

Equipment by a manufacturer which has not been approved prior to the bid shall not be acceptable. The manufacturer shall be named as a part of the bid.

2.2 Prior Approval Submittals:

2.2.1 Substitutes will be considered only when they are submitted 14 days prior to bid date, and are accompanied by sufficient catalog data, specifications, and technical information for evaluation. Summarize proposal with a list of equipment catalog or series numbers.

DIMMING AND CONTROL

260770.1

- Prior approval submittal, review, and approval shall not be considered to be shop drawing review and approval.
- 2.2.2 The stage lighting and control manufacturer shall be one who has been continuously engaged in the manufacture of stage lighting luminaries, wiring devices, control equipment, and SCR dimmers for ten years or more.
- 2.2.3 The dimming system bidders, submitting other equipment, shall include pertinent performance data, charts and drawings showing how the system will function in accordance with the specification, and define how it will deviate from the specification. This submittal shall include, but not be limited to the following.
- 2.2.3.1 Rated ampacity, peak single cycle surge current rating, I²t rating, and Transient voltage rating of the SCR's (or solid state switching modules) employed in the dimmers;
- 2.2.3.2 Laboratory verification of minimum current rise time at a 90° conductive angle, measured from 10% to 90% of the output wave form with the dimmer operating at maximum load;
- 2.2.3.3 Description of the means by which the effect of Electronic Noise Reduction can be achieved to reduce lamp filament noise on any dimmed circuits.
- 2.2.3.4 Description of the air cooling and channel air circulation systems, showing how the dimmer system will meet the requirement for controlled component cooling;
- 2.2.3.5 Description of the packaging and ease of replacement for all spare parts required in this specification, demonstrating the ability to meet the modular spare component requirement of the bid.
- 2.2.3.6 Description of the method employed to meet the switchable Non-Dim requirement of this specification;
- 2.2.3.7 Original Manufacturer's catalog data sheets for all major components of the dimmer system.
- 2.2.4 In the case of substitution for the control system, the bidder shall submit the name of the manufacturer, and list of fifteen or more operating systems installed in the U.S.A. of the type specified which meet the performance and control functions designated.
- 2.2.5 This information shall be mandatory as a basis for determining the bidder's intent in meeting the full requirements of this specification, and shall be submitted at least ten days in advance of bidding. Manufacturers which are not approved prior to the bid shall not be acceptable.
- 2.2.6 It is understood that any additions or revisions of wiring required by the use of substitute equipment, whether such wiring be part of the stage contract or of the prime electrical contract, shall be the responsibility of the bidder making the substitution.
- 2.2.7 If required by the Owner, the Engineer, or the Architect, the bidder shall provide working

DIMMING AND CONTROL

260770.2

- samples of substitute equipment including lamping for any lighting fixtures, to be delivered to the premises designated, for examination by the Architects, Engineers, and such representatives as the Owner may direct. Handling shipping and delivery to, or removal from the site, of any sample required shall be at the cost of the Electrical Contractor. The Electrical Contractor shall be responsible for the arrangement of the cost of electrical supply required to properly test any lighting instruments or item of equipment.
- 2.2.8 Proposals which fail to address specification requirements or review comments will be rejected.
- 2.3 Control Console: Shall be a microprocessor-based lighting control system specifically designed and constructed for the control of theatrical, television, and architectural dimming systems.
- 2.3.1 The Status 24/48 control console shall be a free-standing table-top assembly, no larger than 4" high, 14" deep, and 30.5" long. Weight shall not exceed 17 lbs.
- 2.3.2 The console shall be finished in a gray and black powder coat with white and blue silk screen graphics.
- 2.3.3 Storage capacity for memory operation shall be 120 cues. Console shall control up to 512 dimmers.
- 2.3.4 The console shall not require the use of any peripheral device such as a disk drive or cassette to function. The operating program shall be stored in an internal non-volatile read-only memory (ROM).
- Show data in CMOS memory. Battery backup shall retain data for a minimum of one year without external power.
- 2.3.5 Off-line cue and patch data storage shall be accomplished with an optional EEPROM memory cartridge. Systems utilizing off line storage devices with moving parts such as disk drives shall not be acceptable.
- 2.3.6 Console shall selectively communicate with dimming systems via either the Colortran digital or the USITT DMX-512 protocol.
- 2.3.7 For ease of service, the entire front panel control surface shall hinge up from the console housing.
- 2.4 Standard Features: The left half of the panel is used for manual level setting and playback. The right half of the panel is used for memory setting and playback. The Status 24/48 control console shall provide, but not be limited to the following features and controls:
- 2.4.1 A two-scene or multi-scene select switch which determines two-scene preset operation or memory operation.

DIMMING AND CONTROL

260770.3

- 2.4.2 A Grand Master to provide proportional master level control for all operational functions.
- 2.4.3 A Blackout switch.
- 2.4.4 An airflow LED indicating a loss of airflow condition in the dimmer rack or packs.
- 2.4.5 Forty-eight slide potentiometers for manual two-scene preset operation of twenty-four control channels or single-scene memory operation of 48 control channels.
- 2.4.6 Twenty-four fully-overlapping submaster slide potentiometers or effects masters.
- 2.4.7 Twenty-four bump buttons selectable for momentary Pile-on or Solo operation of Submasters or Channels.
- 2.4.8 Split dipless crossfader to provide manual or timed crossfades between Scene 1 and Scene 2. Timed fade rates adjustable from 0 to 999 seconds.
- 2.4.9 Two green LED bar graphs to indicate fade progress.
- 2.4.10 A back-lit LCD display for viewing Dimmer to Channel Patch, Fade Times, Channel Levels in Live cues, Blind cues, Effects and Submasters, and for setting and reviewing System Parameters. The LCD display shall permit "Blind" setting of cues, effects, and submasters.
- 2.4.11 Four buttons, "Stage", "Cue", "Submaster", and "Setup" for controlling the LCD display.
- 2.4.12 A "Record Cue" button for storing the current stage picture as a Cue.
- 2.4.13 A "Record Submaster" button for storing a stage picture as a Submaster.
- 2.4.14 A "Time" button to assign a fade time to a cue or a step time to an effect.
- 2.4.15 A "Dimmer" button for assigning dimmers to channels in the Electronic Patch.
- 2.4.16 An expanded numeric keypad used to enter numeric information. This key pad shall include "+" (plus), or "@" (at), ">" (thru), ".", and "Enter" keys. The "." permits insertion of up to nine cues between any two whole-numbered cues and the "Enter" key executes a previously specified command string.
- 2.4.17 Dual raise and lower keys for setting levels and paging through menus. One set of keys shall increment level rapidly while the other set of keys increment slowly.
- 2.4.18 A "Next Cue" key to enable cues to be executed out of sequence.
- 2.4.19 A "Fade Time" key to enable the operator to alter the fade time of a cue.
- 2.4.20 A Cycle Mode in which the console automatically executes a sequence of sequential cues.

DIMMING AND CONTROL

260770.4

2.4.21 Effects software which permits up to 24 stepped effects to operate simultaneously with individual level control. Four chase patterns shall be available to the user.

2.5 Sizes and Quantities: Provide the following as manufactured by Colortran, Inc.:

(1)	1	602-106	Status 24/48 with Power Supply factory installed.
(2)	1	168-660	6' Control cable with connectors
(3)	2	168-670	Flush control connection wall plate (fits standard one-gang back box by others)

2.6 Dimmer Rack:

2.6.1 Mechanical:

2.6.1.1 The ENR 24 dimmer rack shall be a free standing dead front switchboard no larger than 21-1/2"H x 14"W x 9"D and shall house all specified equipment. It shall be constructed of code gauge formed steel and aluminum structural members. All bus bars, lugs, and terminals shall be nickel-plated. All exterior surfaces shall be finished in grey or black polyurethane paint. The rack shall weigh no more than 24 lbs. (57 lbs. including dimmers and control modules).

Racks shall be designed to allow for adjacent mounting of multiple racks. The rear section of the rack shall be utilized as a contractor's wireway with a minimum of 5" of wiring space behind the dimmer module. The following knockouts shall be provided on both the top and bottom of the rack for contractor entry: four 1/2", 1", 1-1/4" knockouts and one 1-1/4", 1-1/2" knockout.

2.6.1.2 The rack shall be constructed to permit insertion and removal of dimmers and control modules without the use of tools. Positive, interlocking guides shall be provided for precise alignment of the dimmers to the signal and power connectors in the rack. Dimmer supports shall be incorporated into the sides of the rack, allowing clear access to the power, load, and neutral terminals and the wireway. Racks requiring disassembly to access the terminals and wireway or requiring the use of tools for replacement of dimmers and control modules shall not be acceptable.

2.6.1.3 The rack shall be designed to contain twelve plug-in dimmer modules (either dual 1.8/2.4 kW or single 6.0 kW dimmers). Each module position shall have a mating power bus, two load connectors, and three gold-plated PC signal contacts and shall be mechanically-keyed to accept only the dimmer module specified for that position. The control module position shall include appropriate contractor control signal terminal blocks and a signal distribution connector.

2.6.1.4 The rack shall contain two continuous-duty low-noise fans with a maximum NC rating of 27 to maintain temperatures at proper operating levels with all 2.4 kW dimmers under full load and ambient temperatures up to 40 degrees C. The rack shall be provided with an airflow sensor to shut off dimmers in the rack should safe operating temperatures be exceeded. A signal shall be provided to operate a remove over-temperature LED if the airflow sensor has been activated. Cooling air shall be drawn through the dimmers and exhausted through the top of the rack. Since there is no air flow over any electrical

DIMMING AND CONTROL

260770.5

connections in the dimmer, no filtration shall be required. Racks not using dimmer airflow channels and therefore requiring filters shall not be acceptable.

*A rack equipped with 6.0 kW dimmer modules shall have a maximum NC rating of 33.

- 2.6.1.5 The rack shall have a 24 user-selectable control panic switches located on the signal distribution card in the rack. Racks without a panic feature or using non-reprogrammable panic selection devices such as clippable diodes shall not be acceptable.
- 2.6.1.6 The rack shall have a lockable door with a maximum swing radius of 4-1/2" to prevent unauthorized access to dimmer and control modules. A blank label shall be provided inside the door and directly adjacent to each dimmer for user identification of each circuit.
- 2.6.1.7 Both load and neutral terminals shall accept up to a #2 gauge wire. Neutral terminals shall be located directly adjacent to load terminals for each of contractor wiring. Provisions shall be made for optional fault current protection devices (amp traps) which may be installed and serviced from the front of the rack.
- 2.6.1.8 The rear of the rack shall contain holes for 3/8" diameter bolts for simple contractor installation onto a wall. The location of holes shall be on 16" centers for two-rack assemblies. Unistrut shall be used for assemblies with more than two racks.

2.6.2 Electrical:

- 2.6.2.1 The rack shall be designed to operate from either 120 or 240 volts and either single or three phase power. Knockouts shall be provided on the sides of the rack to allow simple rack to rack bussing.
- 2.6.2.2 The rack shall be factory-tested and control modules shall be burned in at elevated temperatures for a minimum of four hours. The rack shall be UL listed for 120V applications and can have an interrupting capacity of 10,000A.

2.7 Dimmer Modules:

2.7.1 Mechanical:

- 2.7.1.1 Each plug-in module shall consist of a fully enclosed two piece plastic chassis containing one or two circuit breakers, a solid state power device and two filter chokes. The bottom chassis shall be injection molded of high temperature engineering grade composite plastic. The cover shall be injection molded of a high impact plastic and shall include an integral handle. Three independent molded air channels shall provide high velocity ambient air cooling for the power device and filter chokes while preventing airflow over connection points and other components. Dimmers with a single air channel (which develops a thermal gradient from component to component) or dimmers allowing air flow over connection points (which allows the build-up of oil and dust on these connections) shall not be acceptable.
- 2.7.1.2 The module shall be electrically and thermally non-conductive with no thermally hot components accessible when the module is removed from the rack. All internal power

DIMMING AND CONTROL

260770.6

connections shall be made of stamped and formed bronze or nickel-plated copper. All internal signal connections shall be made of stamped and roll-formed gold-plated phosphor bronze. The module shall be completely enclosed with no exposed wires, connections or components and with all external connectors fully recessed. Dimmers with exposed wires, connections, and components or dimmers made of electrically and thermally conductive material shall not be acceptable.

2.7.1.3 The dimmer modules shall have the following maximum dimensions and weights:

Size: 1.25"H x 12.0"W x 4.0"D
 Weight: 2.5 lbs.

2.7.2 Electrical (Dimming):

2.7.2.1 Each dimming channel shall be capable of hot patching cold incandescent loads up to its full rated capacity.

2.7.2.2 Each dimming channel shall operate satisfactorily on 50/60 Hz 100 volts to 130 volts or 200 volts to 260 volts AC lines and in ambient air temperatures from 0-40°C.

2.7.2.3 Each dimming channel shall produce essentially a full sine wave when the control signal is full on, and an output of zero volts when the control signal is off.

2.7.2.4 The output voltage of each dimming channel shall be automatically regulated for incoming line voltage variations except that output voltage cannot be increased above a level equal to the difference between incoming line voltage and dimmer voltage drop. Dimmer voltage drop shall not exceed 3V or 120V units and 5V for 240V units. Line regulation shall be $\pm 2\%V$ for 1% to 100% of rated current at any control setting.

2.7.2.5 The output voltage of each dimming channel shall follow a modified square-law curve from 0 to 100% control signal and shall be repeatable within $\pm 4/-2$ volts. The response time of the dimmer shall not exceed 0.1 second. All dimming curve characteristics shall be factory set with no user adjustments required.

2.7.3 Electrical (Module):

2.7.3.1 The dimmer module shall be protected by one or two fully magnetic circuit breakers with the following ratings:

<u>Catalog #</u>	<u>Description</u>	<u>Current Rating</u>
166-362	Dual 2.4 kW, 120V	2 x 20A

The circuit breakers shall serve as load disconnects and shall have a 10,000 amp interrupting capacity.

2.7.3.2 Each dimmer module shall contain a solid state power device with two or four SCR's in an anti-parallel configuration which are reflow soldered to nickel-plated copper lead frames which are in turn reflowed to a beryllium oxide ceramic substrate. The ceramic

DIMMING AND CONTROL

260770.7

substrate shall be reflow soldered to an integral nickel-plated aluminum heat sink for maximum thermal conductivity and maximum semiconductor reliability. Dimmers using separate semiconductor assemblies (such as solid state relays) attached to a heat sink and requiring heat sink grease and mechanical mounting hardware shall not be acceptable. Surface mounted optical isolators shall be utilized to provide a minimum of 2500 volts of electrical isolation between the power semiconductors and the control signal. The active components in the power device shall be encapsulated in a high dielectric potting compound for mechanical protection and electrical isolation. The SCR's shall have the following minimum ratings:

<u>Catalog #</u>	<u>Description</u> <u>Voltage</u>	<u>Single Cycle Surge</u>	<u>Transient</u>
166-362	Dual 2.4 kW, 120V	650A	600V

2.7.3.3 Each 120V dimmer module shall be a recognized component of Underwriters' Laboratory for incandescent and inductive loads and shall be so labelled.

2.7.4 Environmental:

2.7.4.1 Each Dimmer Module shall include a toroidal filter choke to limit objectionable harmonics, radiated radio frequencies electromagnetic interference on the conductors and acoustical noise in the load amp filament. Current rise time shall be no less than 500 microseconds measured at 90 degrees conductive angle from 10% to 90% of the output wave form with the dimmer operating at maximum load.

An ENR (Electronic Noise Reduction) SCR firing technique shall further reduce incandescent lamp filament noise below that produced by a conventional 500 microsecond rise time dimmer. In a typical downlight fixture utilizing an R40 lamp source or in a 2 kW Fresnel with a CYX lamp, there shall be an average reduction of 6 decibels or one fourth the sound pressure level generated by a conventional 500 microsecond rise time dimmer without ENR.

2.7.4.2 Power efficiency of each dimming channel shall be at least 97% at full load. Maximum heat loss for each dimming channel shall be as follows:

<u>Catalog #</u>	<u>Description</u>	<u>Watts</u>	<u>BTU/hr</u>	<u>Tons AC</u>
166-362	Dual 2.4 kW, 120V	54	184	.015

2.7.5 Quantities and Sizes:

2.7.5.1 Provide the following modules as manufactured by Colortran, Inc.:

- (1) 10 #166-362 Dual 2.4 kW Dimmer Modules
- (2) 2 #166-360 Air Flow Control Modules

2.8 Connector Strip and Plug Boxes:

DIMMING AND CONTROL

260770.8

- 2.8.1 This assembly shall consist of a code gauge aluminum wire-way 4" x 3" in cross section in lengths specified containing terminal strips for feed connections, and wire extending to pigtails terminating in receptacles as specified, or to flush mounted receptacles as specified.
- 2.8.1.1 Female 120V receptacles shall be as follows:
- 2 pole 3 wire grounding pin connectors in capacities specified (20 ampere).
- 2.8.1.2 The strip shall contain 150°C rated wiring of proper size and quantity to connect the individual outlets to the terminal blocks in circuits of capacity as specified.
- 2.8.1.3 Pigtails shall be 18" long (unless otherwise specified), rubber covered type S, SO or ST and shall be secured to the strip body by strain relief clamps.
- 2.8.1.4 Strip shall be supplied with 3/16" thick x 2" wide steel mounting brackets each with 1/8" x 1" formed steel hold-down bracket for attachment at adjustable locations along the strip. Bracket suitable for surface, pipe or cable mounting as specified shall be finished identical to strip and supplied in quantities to support strip on 5' centers. A U-bolt shall be supplied to grip up to 1-1/2" T.S. (2" if specified) pipe for each non-surface mounting bracket.
- 2.8.1.5 For Connector Strips containing in excess of 12-20 amp circuits, an extended terminal box of appropriate length shall be incorporated on either end or in the center, of the strip, as specified. A bracket, similar in construction to the other brackets, specifically designed to support the extended box shall be provided for all hanging units.
- 2.8.2 Standard Features:
- 2.8.2.1 UL listed and labeled. Finished in black baked enamel with large 3" white circuit numbers to permit circuit identification from floor.
- 2.8.2.2 Completely prewired to terminals under an easy-to-remove cover ready to install.
- 2.8.2.3 Mounting brackets provided for surface, cable or pipe mounting.
- 2.8.2.4 Safe rugged construction ideal for television studio and theater power distribution.
- 2.8.3 Quantities and Sizes: Provide connector strips and plug boxes as manufactured by SSRC, Inc. and as indicated in contract drawings.
- 3 EXECUTION:
- 3.1 Field Quality and Control:
- 3.1.1 Installer must examine areas and conditions under which stage lighting and controls are to be installed and notify contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions

DIMMING AND CONTROL

260770.9

- have been corrected in a manner acceptable to the installer.
- 3.1.2 At the date of substantial completion, replace lamps in stage lighting fixtures which are observed to be noticeably dimmed after Electrical Contractor's use and testing, as judged by the Engineer.
- 3.2 Installation: Install stage lighting and controls where shown, in accordance with manufacturer's written instructions and with recognized industry practice to ensure that stage lighting equipment complies with applicable requirements of NEC and UL standards and with the applicable portions of NECA's "Standard of Installation".
- 3.3 Adjust and Clean:
- 3.3.1 Clean stage lighting equipment of dirt and debris upon completion of installation.
- 3.3.2 Protect installed stage lighting equipment and lamps during remainder of construction period.

END OF SECTION

DIMMING AND CONTROL

260770.10

SECTION 260900 / WORK REQUIRED FOR EQUIPMENT FURNISHED IN OTHER DIVISIONS1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Materials for this section are specified in the Section "Basic Materials and Methods."
- 2.2 Refer to the section "Related Divisions and Sections" for equipment that is furnished in other Divisions.

3 EXECUTION

- 3.1 Provide raceway boxes, fittings, devices and conductors for the electrical power to equipment furnished and installed in the other Divisions.
- 3.2 Make connections for the electrical power to equipment furnished and installed in other Divisions.

END OF SECTION

WORK REQUIRED FOR EQUIPMENT FURNISHED IN OTHER DIVISIONS

260900.1

SECTION 260923 / LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following lighting control devices:
 - 1. Time switches.
 - 2. Outdoor and indoor photoelectric switches.
 - 3. Indoor occupancy sensors.
 - 4. Outdoor motion sensors.
 - 5. Lighting contactors.
 - 6. Emergency shunt relays.

1.3 DEFINITIONS

- A. LED: Light-emitting diode.
- B. PIR: Passive infrared.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
 - 1. Interconnection diagrams showing field-installed wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

LIGHTING CONTROL DEVICES

260923.1

1.6 COORDINATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - 1. Area Lighting Research, Inc.; Tyco Electronics.
 - 2. Leviton Mfg. Company Inc.
 - 3. Square D; Schneider Electric.
 - 4. TORK.
 - 5. Watt Stopper (The).
- B. Electronic Time Switches: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.
 - 1. Contact Configuration: [SPST] [DPST] [DPDT]
 - 2. Contact Rating: [30-A inductive or resistive, 240-V ac] [20-A ballast load, 120/240-V ac].
 - 3. Program: An annual holiday schedule that overrides the weekly operation on holidays.
 - 4. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.
 - 5. Astronomic Time: All channels.
 - 6. Battery Backup: For schedules and time clock.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
 - 1. Area Lighting Research, Inc.; Tyco Electronics.
 - 2. Intermatic, Inc.
 - 3. Paragon Electric Co.; Invensys Climate Controls.
 - 4. TORK.
 - 5. Watt Stopper (The).
- B. Description: Solid state, with [SPST] [DPST] dry contacts rated for [1800-VA tungsten or 1000-VA inductive], to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.

LIGHTING CONTROL DEVICES

260923.2

1. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of photocell to prevent fixed light sources from causing turn-off.
2. Time Delay: 15-second minimum, to prevent false operation.
3. Surge Protection: Metal-oxide varistor, complying with IEEE C62.41.1, IEEE C62.41.2, and IEEE 62.45 for Category A1 locations.
4. Mounting: Twist lock complying with IEEE C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

2.3 INDOOR PHOTOELECTRIC SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
1. Area Lighting Research, Inc.; Tyco Electronics.
 2. Intermatic, Inc.
 3. MicroLite Lighting Control Systems.
 4. Paragon Electric Co.; Invensys Climate Controls.
 5. TORK.
 6. Watt Stopper (The).
- B. Ceiling-Mounted Photoelectric Switch: Solid-state, light-level sensor unit, with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.
1. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 2. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 3. Light-Level Monitoring Range: 10 to 200 fc, with an adjustment for turn-on and turn-off levels within that range.
 4. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.
 5. Indicator: Two LEDs to indicate the beginning of on-off cycles.
- C. Skylight Photoelectric Sensors: Solid-state, light-level sensor; housed in a threaded, plastic fitting for mounting under skylight, facing up at skylight; with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.
1. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 2. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 3. Light-Level Monitoring Range: 1000 to 10,000 fc, with an adjustment for turn-on and turn-off levels within that range.

LIGHTING CONTROL DEVICES

260923.3

4. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.
5. Indicator: Two LEDs to indicate the beginning of on-off cycles.

2.4 INDOOR OCCUPANCY SENSORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
1. Hubbell Lighting.
 2. Leviton Mfg. Company Inc.
 3. Lithonia Lighting; Acuity Lighting Group, Inc.
 4. Novitas, Inc.
 5. RAB Lighting, Inc.
 6. Sensor Switch, Inc.
 7. TORK.
 8. Watt Stopper (The).
- B. General Description: Wall- or ceiling-mounting mounted, solid-state units with a separate relay unit.
1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, and Class 2 power source as defined by NFPA 70.
 4. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
 6. Bypass Switch: Override the on function in case of sensor failure.
 7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; keep lighting off when selected lighting level is present.
- C. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.

LIGHTING CONTROL DEVICES

260923.4

2. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.

2.5 OUTDOOR MOTION SENSORS (PIR)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
 1. Hubbell Lighting
 2. Paragon Electric Co.; Invensys Climate Controls.
 3. TORK.
 4. Watt Stopper (The).
- B. Performance Requirements: Suitable for operation in ambient temperatures ranging from minus 400F to plus 1300F, rated as raintight according to UL 773A.
 1. Operation: Turn lights on when sensing infrared energy changes between background and moving body in area of coverage; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 2. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outdoor junction box.
 - b. Relay: Internally mounted in a standard weatherproof electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 3. Bypass Switch: Override the on function in case of sensor failure.
 4. Automatic Light-Level Sensor: Adjustable from 1 to 20 fc; keep lighting off during daylight hours.
- C. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
- D. Detection Coverage: Up to 100 feet, with a field of view of 60 degrees. Individually Mounted Sensor: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 1. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 2. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.

LIGHTING CONTROL DEVICES

260923.5

2.6 LIGHTING CONTACTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
1. ASCO Power Technologies, LP; a division of Emerson Electric Co.
 2. Eaton Electrical Inc.; Cutler-Hammer Products.
 3. Hubbell Lighting.
 4. MicroLite Lighting Control Systems.
 5. Square D; Schneider Electric.
 6. TORK.
 7. Touch-Plate, Inc.
 8. Watt Stopper (The).
- B. Description: Electrically operated and mechanically held, combination type with fusible switch, complying with NEMA ICS 2 and UL 508.
1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
 2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
 3. Enclosure: Comply with NEMA 250.
 4. Provide with control and pilot devices as indicated on Drawings, matching the NEMA type specified for the enclosure.
- C. BAS Interface: Provide hardware interface to enable the BAS to monitor and control lighting contactors.
1. Monitoring: On-off status,
 2. Control: On-off operation,

2.7 EMERGENCY SHUNT RELAY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:
1. Lighting Control and Design, Inc.
 2. Nine 24, Inc.
 3. Watt Stopper / Legrand
- B. Description: Normally closed, electrically held relay, arranged for wiring in parallel with manual [or automatic] switching contacts; complying with UL 924.
1. Coil Rating: 120 and/or 277 V.

LIGHTING CONTROL DEVICES

260923.6

2.8 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

- A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

- A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

- A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be.
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

LIGHTING CONTROL DEVICES

260923.7

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
 - 2. Operational Test: Verify operation of each lighting control device, and adjust time delays.
- B. Lighting control devices that fail tests and inspections are defective work.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.7 DEMONSTRATION

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control system specified in Division 26 Section "Network Lighting Controls."
- B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

LIGHTING CONTROL DEVICES

260923.8

SECTION 265119 / LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.

- B. Related Requirements:

- 1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multi-pole lighting relays and contactors.
 - 2. Section 26 09 43.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

LED INTERIOR LIGHTING

265119.1

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project IES LM-79 and IES LM-80.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Lighting luminaires.
2. Suspended ceiling components.
3. Partitions and millwork that penetrate the ceiling or extend to within 300 mm of the plane of the luminaires.
4. Structural members to which equipment and or luminaires will be attached.
5. Initial access modules for acoustical tile, including size and locations.
6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.

LED INTERIOR LIGHTING

265119.2

- e. Access panels.
 - f. Ceiling-mounted projectors.
 - 7. Moldings.
 - B. Qualification Data: For testing laboratory providing photometric data for luminaires.
 - C. Sample warranty.
- 1.6 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.
- 1.7 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps: Ten (10) for every 100 of each type and rating installed. Furnish at least one of each type.
 - 2. Diffusers and Lenses: One (1) for every 100 of each type and rating installed. Furnish at least one of each type.
 - 3. Globes and Guards: One (1) for every 20 of each type and rating installed. Furnish at least one of each type.
- 1.8 QUALITY ASSURANCE
- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
 - B. Provide luminaires from a single manufacturer for each luminaire type.
 - C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
 - D. Mockups (where indicated on plans or notes): For interior lighting luminaires in room or module mockups, complete with power and control connections.
 - 1. Obtain Architect's approval of luminaires in mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

LED INTERIOR LIGHTING

265119.3

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. Recessed Fixtures: Comply with NEMA LE 4.
- E. Bulb shape complying with ANSI C79.1.
- F. Lamp base complying with ANSI C81.61.
- G. CRI of 80 CCT of 3500 K.
- H. Rated lamp life of 50,000 hours.
- I. Lamps dimmable from 0 - 10 percent of maximum light output.
- J. Internal driver.
- K. Nominal Operating Voltage: 277 V AC.

LED INTERIOR LIGHTING

265119.4

1. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

L. Housings:

1. As specified in Luminaire Schedule

2.2 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers and Globes:

1. As specified in Luminaire Schedule

D. Housings:

1. As specified in Luminaire Schedule.

E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI for all luminaires.

2.3 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

LED INTERIOR LIGHTING

265119.5

2.4 LUMINAIRE FIXTURE SUPPORT COMPONENTS

- A. Comply with requirements in Section 26 05 29 "Raceways & Electrical System Supports" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)
- D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.

LED INTERIOR LIGHTING

265119.6

D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaire Support:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaire Support:

1. Attached to a minimum 20 gauge backing plate attached to wall structural members.
2. Do not attach luminaires directly to gypsum board.

G. Ceiling-Mounted Luminaire Support:

1. As specified in Luminaire Schedule

H. Suspended Luminaire Support:

1. As specified in Luminaire Schedule
2. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

I. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

J. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

LED INTERIOR LIGHTING

265119.7

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 STARTUP SERVICE

- A. Comply with requirements for startup specified in Section 26 09 43.23 "Relay-Based Lighting Controls."

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

LED INTERIOR LIGHTING

265119.8

SECTION 270712 / TELEPHONE, COMPUTER, TELEVISION SYSTEMS1 GENERAL

- 1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.
- 1.2 Division-26 Basic Electrical Materials and Methods Sections apply to work of this Section.
- 1.3 Submittals: Submit the producer's standard descriptive data sheets for each type of product being provided. Mark the data sheet for the product being provided with an identifying mark or arrow.

2 PRODUCTS

- 2.1 Provide raceways, fittings and boxes that conform to the Section "Basic Materials and Methods."
- 2.2 Provide screw type copper ground bus with minimum #6 (provide a different size if so indicated on the Drawings for the telecommunications bonding jumper) copper radial connections to all installed equipment, raceway and connecting communications and power feeders and branch circuits. All grounds must be radial without loop through, joint or splice. Daisy-chain grounds are specifically forbidden. Building telecommunications bonding jumpers shall be homerun back to the existing building main telecommunications room.

3 EXECUTION

- 3.1 Telephone and computer data network conduit systems shall be complete including outlets and conduits for feeder cables. Provide terminal boards required for the systems. Telecommunications, data, or TV service providers or Owner's vendors will provide all telephone service, networking, and TV cables for services and branch distribution as well as the terminations for these cables.
- 3.2 Provide boxes and conduits with pull wire or pull rope for installation of the systems. See Drawings for sizes and locations.
- 3.3 Provide eight feet high 3/4" thick Readyspec plywood back boards completely covering all walls of any Telecommunications Rooms (TRs). The Readyspec backboard shall be painted gray with two coats of 100% latex primer sealer applied to the front and sides of backboards. Install back board panels to support 500 pounds per sheet with a 1 foot moment arm. Paint with two coats of fire retardant gray. Clearly indicate the fire resistivity and affix to the backboard. Provide cutouts as necessary for building systems. The backboard shall reach from corner to corner. Install the backboard vertically at 12" AFF and anchor securely to wall substrate with a minimum of five (5) equally spaced fasteners along each vertical edge and down the centerline of each panel. Backboard kits shall include fasteners for masonry, hollow block, steel frame and wood frame walls. Fasteners must be flush with surface of backboard. Fasteners shall be of the appropriate type for each substrate. Install fasteners flush with the surface of the

TELEPHONE, COMPUTER, TELEVISION SYSTEMS

270712.1

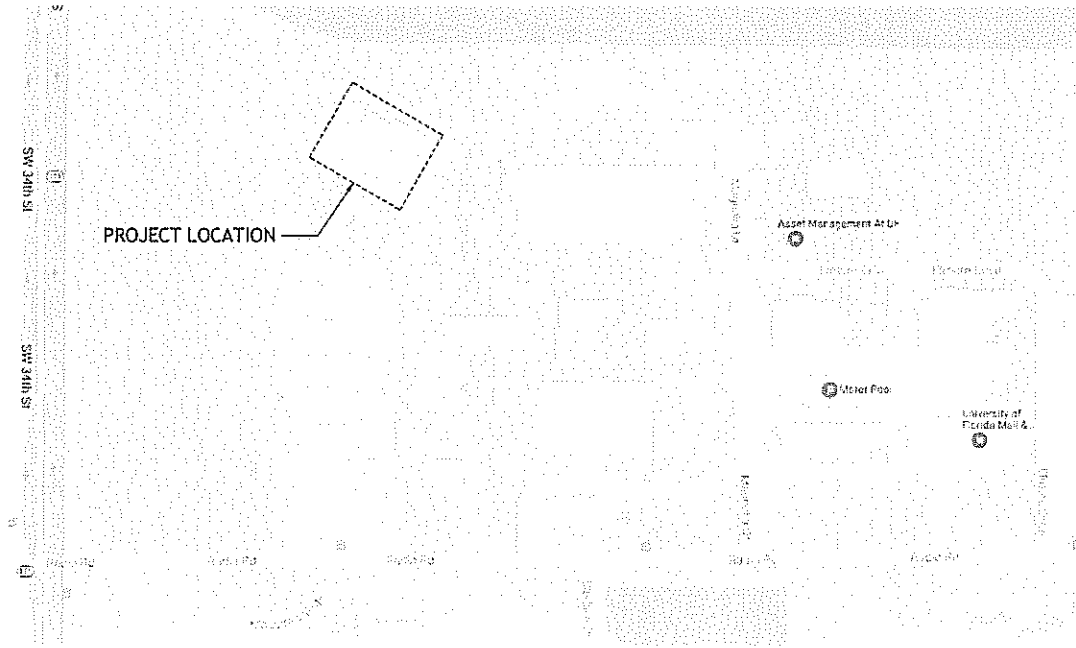
- backboard. Provide blocking or additional studs in framed walls to receive backboard panel fasteners. Provide any power receptacles in any TRs such that they are completely below 12 inches AFF, and below the backboards.
- 3.4 Provide screw type copper ground bus with minimum #6 (provide a different size if so indicated on the Drawings for the telecommunications bonding jumper) copper radial connections to all installed equipment, raceway and connecting communications and power feeders and branch circuits. All grounds must be radial without loop through, joint or splice. Loop through or daisy-chain grounds are specifically forbidden. Ground all equipment racks. Provide separate, minimum, #6 AWG telecommunications bonding jumpers (provide a different size if so indicated on the Drawings for the telecommunications bonding jumper) in 1 inch conduits from existing building main telecommunications room to each new telecommunications room provided under this contract.
- 3.5 Ream out all conduits. Conduits not terminating in boxes or cabinets shall be terminated with bushings.
- 3.6 Conduit with more than two right angle bends, or exceeding 200 feet in length shall have an intermediate pull box. Pull boxes shall have full size screw-fastened covers.
- 3.7 All wall outlets shall be flush and have nylon or fiberglass reinforced cover with bushed opening.
- 3.8 Refer to the Drawings for feeder conduit sizes.
- 3.9 Installation of devices, equipment and feeder cables are not included in the work of this Contract.

END OF SECTION

TELEPHONE, COMPUTER, TELEVISION SYSTEMS

270712.2

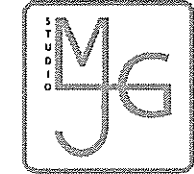
MP02649 BUILDING 700 RENOVATION - PHASE - 2



LOCATION MAP

SHEET INDEX

G100	COVER SHEET
LIFE SAFETY	
LS111	LIFE SAFETY BUILDING SUMMARY, CODE REFERENCE AND FLOOR PLAN
ARCHITECTURAL	
A101	ARCHITECTURAL DEVOLITION FLOOR PLAN AND REF. CEILING PLAN
A111	ARCHITECTURAL RENOVATION FLOOR PLAN AND REFLECTED CEILING PLAN
A112	ARCHITECTURAL DIMENSION PLAN, FINISH PLAN, SCHEDULE & LEGEND
A510	ARCHITECTURAL OPENING SCHEDULE, TYPES, AND DETAILS
A610	ARCHITECTURAL INTERIOR PARTITION TYPES
MECHANICAL	
M001	MECHANICAL LEGEND, NOTES & SCHEDULES
M101	MECHANICAL DEVOLITION FLOOR PLAN
M201	MECHANICAL FLOOR PLAN
ELECTRICAL	
E001	ELECTRICAL LEGEND, NOTES & ABBREVIATIONS
E101	ELECTRICAL DEVOLITION FLOOR PLAN, PANEL SCHEDULE & RISERS
E201	ELECTRICAL POWER & LIGHTING FLOOR PLANS
TELECOMMUNICATION	
T101	TELECOM FLOOR PLAN, LEGEND & RISER



STUDIO M&G, LLC
 5206 SW 1ST TERRACE, SUITE A
 GAINESVILLE, FLORIDA 32608
 WWW.STUDIOMAG.COM

**MP02649 BUILDING 700 RENOVATION -
 PHASE - 2**
 UNIVERSITY OF FLORIDA 3280 RADIO RD
 GAINESVILLE, FL 32611

100% CONSTRUCTION DOCUMENTS

Digitally signed by Michael J. Gilfilen
 DN: cn=Michael J. Gilfilen, o=Studio M&G, ou=Michael J. Gilfilen, email=michael@studiomag.com
 Reason: I am approving this document
 Date: 2017.08.21 15:36:44 -0400

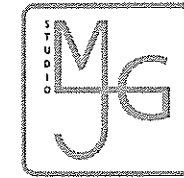
Michael J. Gilfilen
 AR94453

No.	DESCRIPTION	DATE

PROJECT NUMBER: 17016
 ISSUE DATE: 18 AUGUST 2017
 CREATED BY: M&G
 CHECKED BY: M&G

G100
 COVER SHEET

8/21/2017 2:06:51 PM



STUDIO M&J, LLC
5706 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJ.COM

**MP02649 BUILDING 700 RENOVATION -
PHASE - 2**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

100% CONSTRUCTION
DOCUMENTS

Michael J. Gilfilen
Professional Engineer
License No. AR94453
State of Florida
Exp. 08/18/2017

Michael J. Gilfilen
AR94453

NO.	DESCRIPTION	DATE

PROJECT NUMBER:	17016
ISSUE DATE:	18 AUGUST 2017
CREATED BY:	MAJ
CHECKED BY:	MAJ

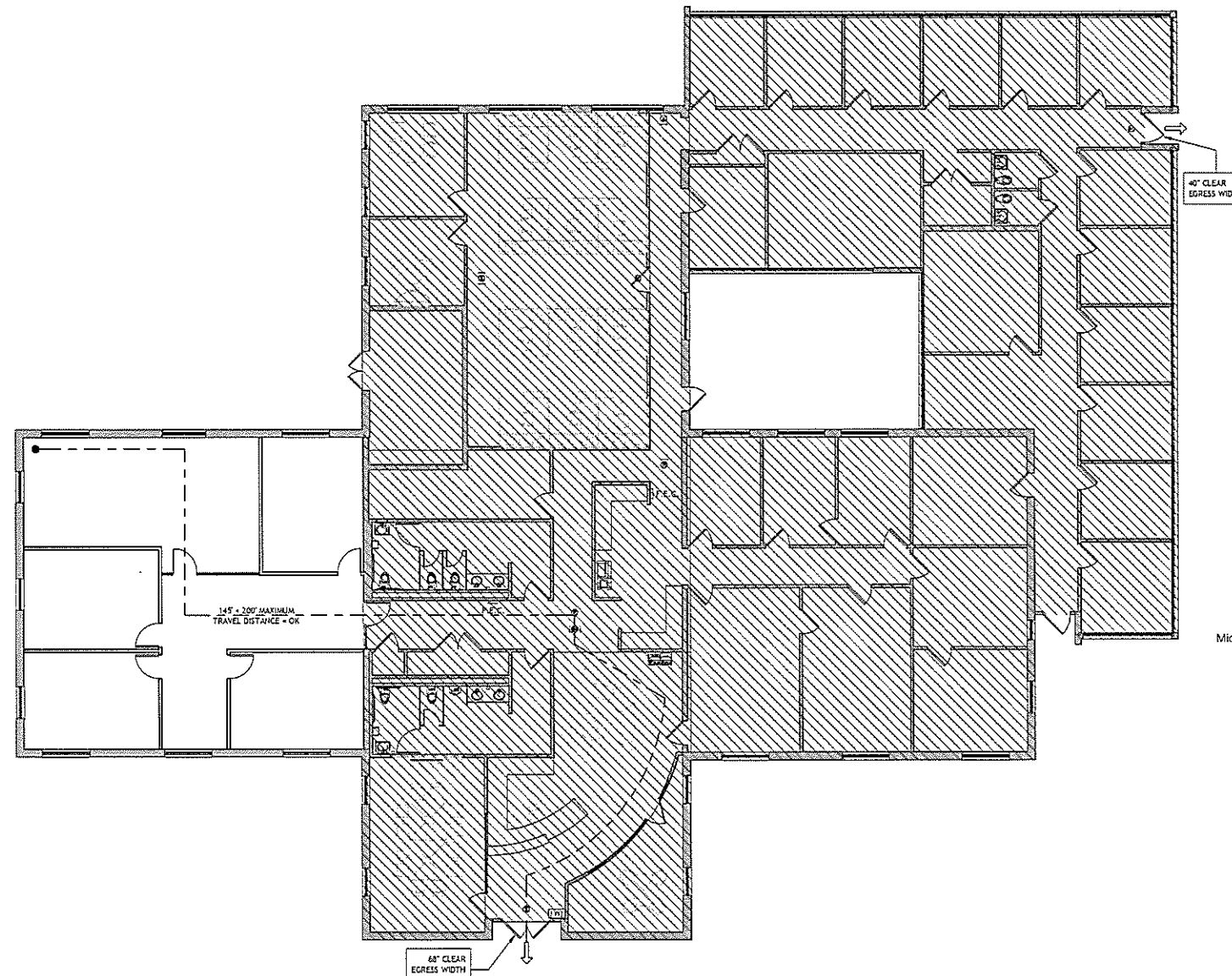
LS111
LIFE SAFETY
BUILDING SUMMARY,
CODE REFERENCE
AND FLOOR PLAN

08/18/2017 3:00:53 PM

	EGRESS EXIT	F.E.C.	FIRE EXTINGUISHER CABINET
	PATH OF TRAVEL	F.E.	WALL MOUNTED FIRE EXTINGUISHERS
	1HR FIRE RATING		EXIT SIGN
	2HR FIRE RATING		TACTILE EXIT SIGNAGE PER FBCE (2014) 1006.3.4, 8 NFPA 101(2014) 7.10.1.3.

ALL UNIVERSITY OF FLORIDA DESIGN AND CONSTRUCTION STANDARDS	
FFPC	FLORIDA FIRE PREVENTION CODE 5TH EDITION - 2014
NFPA	1 FIRE CODE - 2012
NFPA	101 LIFE SAFETY CODE - 2012
NFPA	10 STANDARD FOR PORTABLE FIRE EXTINGUISHERS - 2010
NFPA	13 STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS - 2010
NFPA	70 NATIONAL ELECTRICAL CODES - 2011
NFPA	72 NATIONAL FIRE ALARM AND SIGNALING CODE - 2010
NFPA	90A INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS - 2012
FBC	FLORIDA BUILDING CODE, BUILDING - 2014
FBC	FLORIDA BUILDING CODE, EXISTING BUILDING - 2014
FBC	FLORIDA BUILDING CODE, MECHANICAL - 2014
FBC	FLORIDA BUILDING CODE, PLUMBING - 2014
FLORIDA ADMINISTRATIVE CODE (FAC) AND FLORIDA STATUTES AS AMENDED, INCLUDING BUT NOT LIMITED TO:	
A. STATE OF FLORIDA ENERGY CONSERVATION CODE (FLEET ANALYSIS PROGRAM)	
B. RULES AND REGULATIONS OF THE STATE FIRE MARSHAL (TITLE 44)	
C. RULES AND REGULATIONS OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION	

OCCUPANCY CLASSIFICATION	BUSINESS "B"
EXISTING CONSTRUCTION TYPE	TYPE - II UNPROTECTED
FIRE SUPPRESSION SYSTEM	NOT SPRINKLERED
PORTABLE FIRE EXTINGUISHERS	PROVIDE 75 FT. MAX.
PROJECT SQUARE FOOTAGE	
PHASE2	1,859 SQFT
	TOTAL PROJECT AREA = 3,859 SQFT
OCCUPANT LOAD	
FPD - BUILDING 700	BUSINESS = 1,859/100 = 18.59
	TOTAL OCC. LOAD = 19
EGRESS REQUIREMENTS	
MINIMUM CORRIDOR WIDTH	19 OCC. X 0.2 INCH = 3.8" (44" MIN.)
MAXIMUM TRAVEL DISTANCE	200' (HOT SPRINKLERED)
COMMON PATH OF TRAVEL	50' (HOT SPRINKLERED)
MAXIMUM DEAD END CORRIDOR	20' (HOT SPRINKLERED)



① LIFE SAFETY PLAN - PHASE - 2
1/8" = 1'-0"



STUDIO M&G, LLC
5256 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMAG.COM

**MP02649 BUILDING 700 RENOVATION -
PHASE - 2**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

100% CONSTRUCTION DOCUMENTS

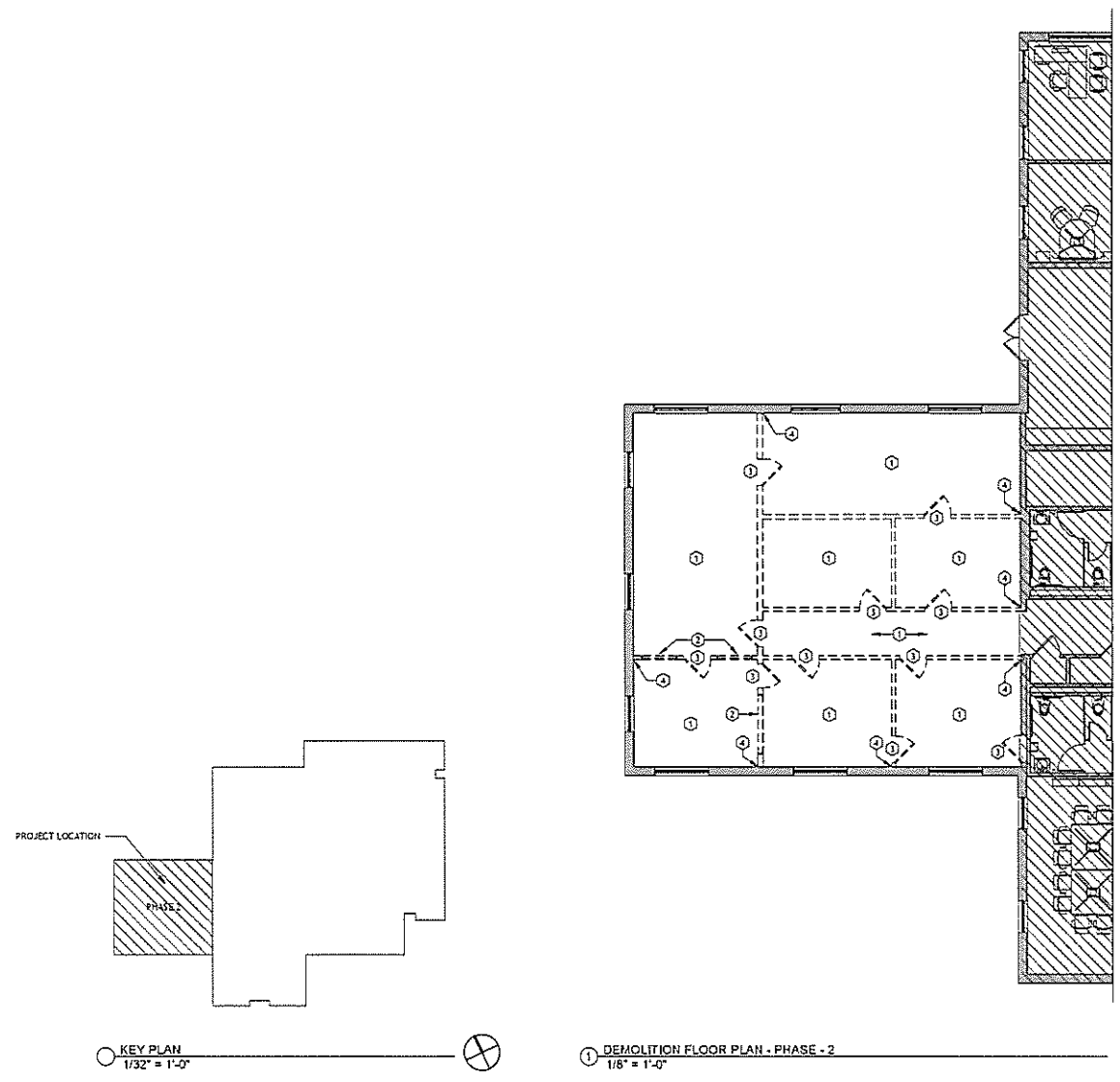
Digitally signed by Michael J. Gilfilen
DN: cn=Michael J. Gilfilen, email=gilfilen@studiomag.com,
ou=Studio M&G, c=US
Reason: I am approving this document
Signed with my personal key
Date: 2017.08.21 11:05:00 -0400

Michael J. Gilfilen
AR94453

NO.	DESCRIPTION	DATE

PROJECT NUMBER: 17016
ISSUE DATE: 18 AUGUST 2017
CREATED BY: AJG
CHECKED BY: AJG

A101
ARCHITECTURAL
DEMOLITION FLOOR
PLAN AND REF.
CEILING PLAN
8/21/2017 7:00:48 PM



KEY PLAN
1/32" = 1'-0"

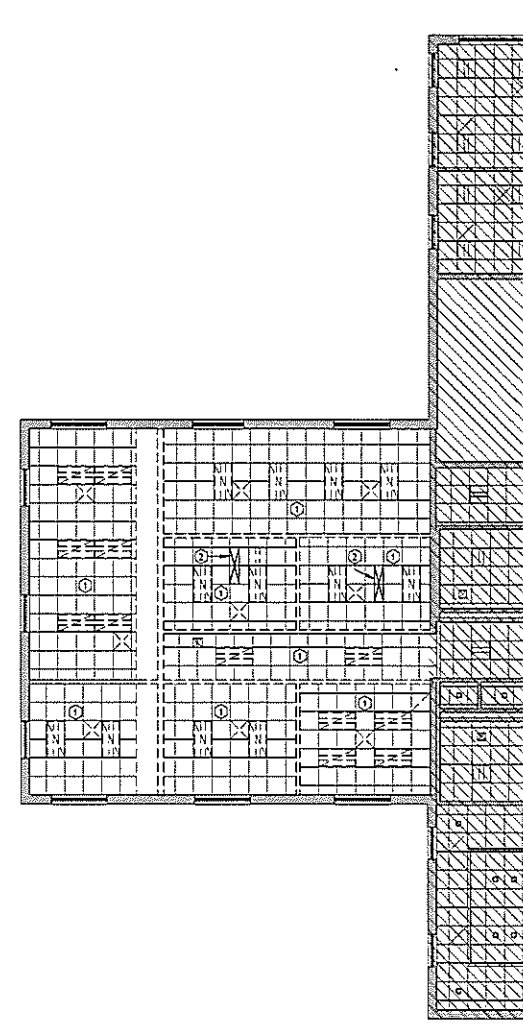
1 DEMOLITION FLOOR PLAN - PHASE - 2
1/8" = 1'-0"

WALL TYPE LEGEND

	EXISTING WALLS
	WALLS TO BE REMOVED
	NEW CONSTRUCTION

DEMOLITION NOTES

1	REMOVE EXISTING FLOORING FINISHES AND WALL BASE, PREP AND SKIM FLOOR TO BE FLAT PRIOR TO INSTALLING NEW FINISH
2	REMOVE EXISTING INTERIOR WINDOW
3	REMOVE EXISTING DOOR, FRAME AND ALL ASSOCIATED HARDWARE (TURN KEY CYLINDER OVER TO OWNER)
4	PATCH AND REPAIR WALLS AS REQUIRED



2 DEMOLITION REFLECTED CEILING PLAN - PHASE - 2
1/8" = 1'-0"

DEMO RCP LEGEND

	2x2 CEILING GRID		EXIT SIGN
	2x2 LAY-IN FIXTURE		SUPPLY DIFFUSERS
	2x2 LAY-IN FIXTURE		RETURN GRILLE
	RECESSED DOWNLIGHT		SKYLIGHT

DEMOLITION RCP NOTES

1	REMOVE EXISTING SUSPENDED CEILING SYSTEM AND ALL ASSOCIATED LIGHTING FIXTURES AND GRILLES
2	EXISTING SKYLIGHT TO REMAIN. CLEAN EXISTING LEADS AND SEAL ALL JOINTS



STUDIO MJD, LLC
5204 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJD.COM

**MP02649 BUILDING 700 RENOVATION -
PHASE - 2**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

100% CONSTRUCTION
DOCUMENTS

Michael J. Gilfilen
Project Manager
Architect
10/2/2017
11:44 AM

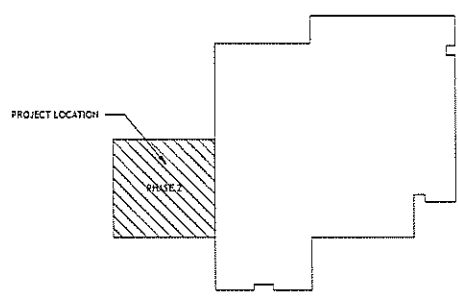
Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE

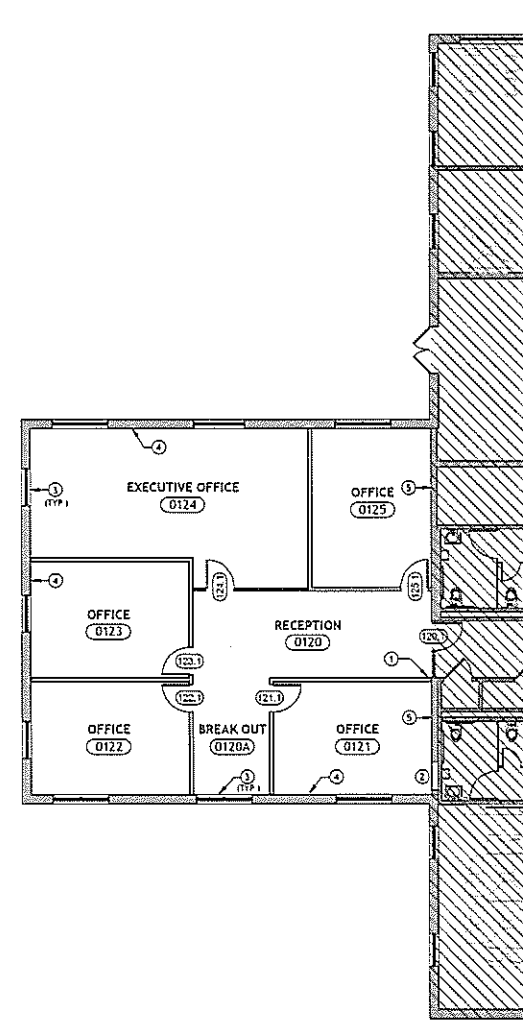
PROJECT NUMBER:	17016
ISSUE DATE:	18 AUGUST 2017
CREATED BY:	MJG
CHECKED BY:	MJG

A111
ARCHITECTURAL
RENOVATION FLOOR
PLAN AND
REFLECTED CEILING
PLAN

8/21/2017 2:00:49 PM



KEY PLAN
1/32" = 1'-0"



1 ARCHITECTURAL RENOVATION FLOOR PLAN - PHASE - 2
1/8" = 1'-0"

WALL TYPE LEGEND

	EXISTING WALLS
	WALLS TO BE REMOVED
	NEW CONSTRUCTION

RENOVATION NOTES

- ALIGN WALL FINISH WITH THE ADJACENT CORRIDOR WALL
- INFILL OPENING WITH PART 01 518 GYPSUM WALLBOARD ON 3 5/8" METAL STUD FRAMING
- INSTALL NEW SOLID SURFACE WINDOW SILLS
- PATCH AND REPAIR ALL EXISTING EXTERIOR WALL SURFACES AS REQUIRED TO PROVIDE A UNIFORM LEVEL 4 FINISH PRIOR TO PAINT
- PATCH AND REPAIR ALL EXISTING WALL SURFACES AS REQUIRED TO PROVIDE A UNIFORM LEVEL 4 FINISH PRIOR TO PAINT

REFLECTED CEILING PLAN LEGEND

	2X2 CEILING GRID		SUPPLY DIFFUSERS
	2X2 LAY-IN LIGHT FIXTURE (UNLESS NOTED OTHERWISE)		RETURN GRILLE
	RECESSED DOWNLIGHT		EXHAUST FAN
	SKYLIGHT DIFFUSER		EXIT SIGN

2 ARCHITECTURAL RENOVATION REFLECTED CEILING PLAN - PHASE - 2
1/8" = 1'-0"

REFLECTED CEILING PLAN NOTES

- NEW SUSPENDED CEILING SYSTEM
- NEW SKYLIT WITH PART 01 518 GYPSUM WALLBOARD ON 3 5/8" METAL STUD FRAMING



STUDIO M.J.G. LLC
5204 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 RENOVATION -
PHASE - 2**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

100% CONSTRUCTION DOCUMENTS

Michael J. Gilfilen
AR94453

Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE

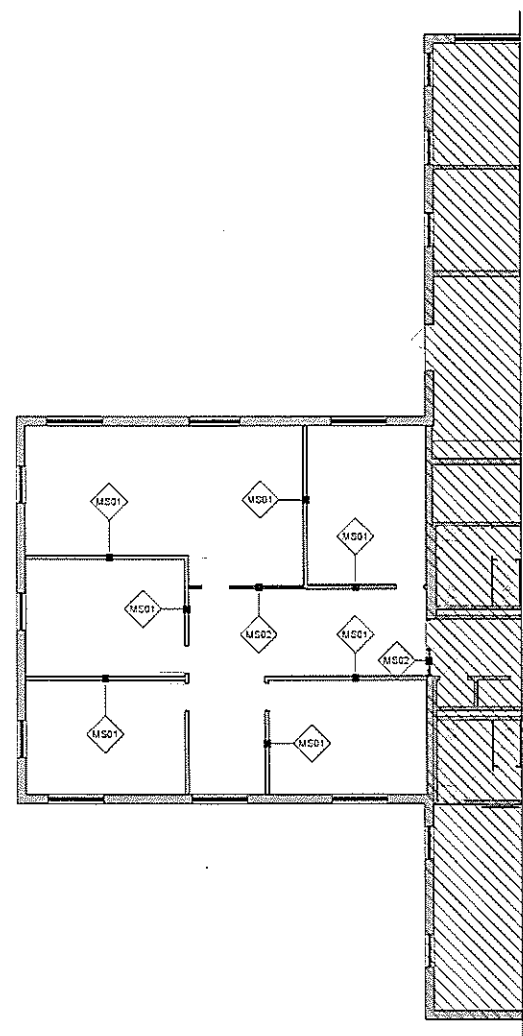
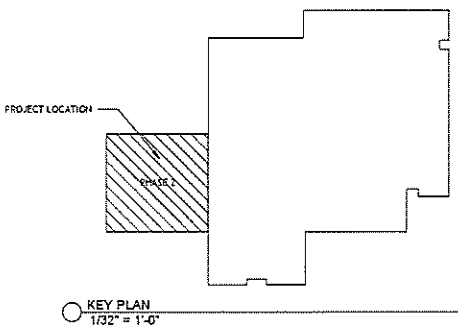
PROJECT NUMBER: 17016
ISSUE DATE: 18 AUGUST 2017
CREATED BY: MJG
CHECKED BY: MJG

A112
ARCHITECTURAL
DIMENSION PLAN,
FINISH PLAN,
SCHEDULE & LEGEND

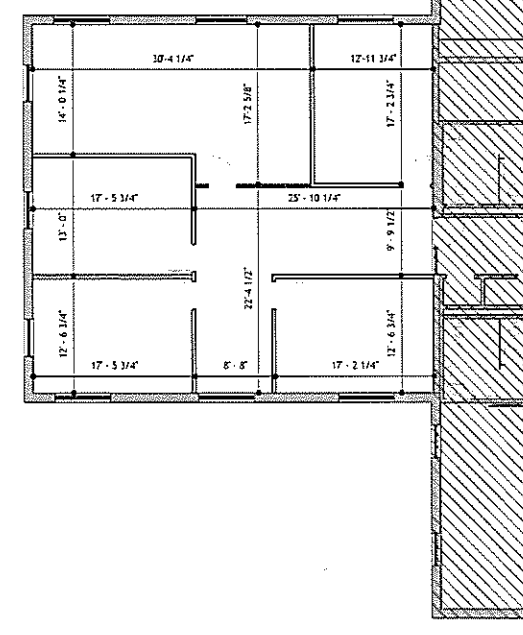
8/17/2017 2:00:30 PM

NUMBER	NAME	FLOOR	BASE	WALL	CEILING	Comments
0120	RECEPTION	CPT-1	RB-1	PT-1	ACT-1	
0120A	BREAK OUT	CPT-1	RB-1	PT-1	ACT-1	
0121	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0122	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0123	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0124	EXECUTIVE OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0125	OFFICE	CPT-1	RB-1	PT-1	ACT-1	

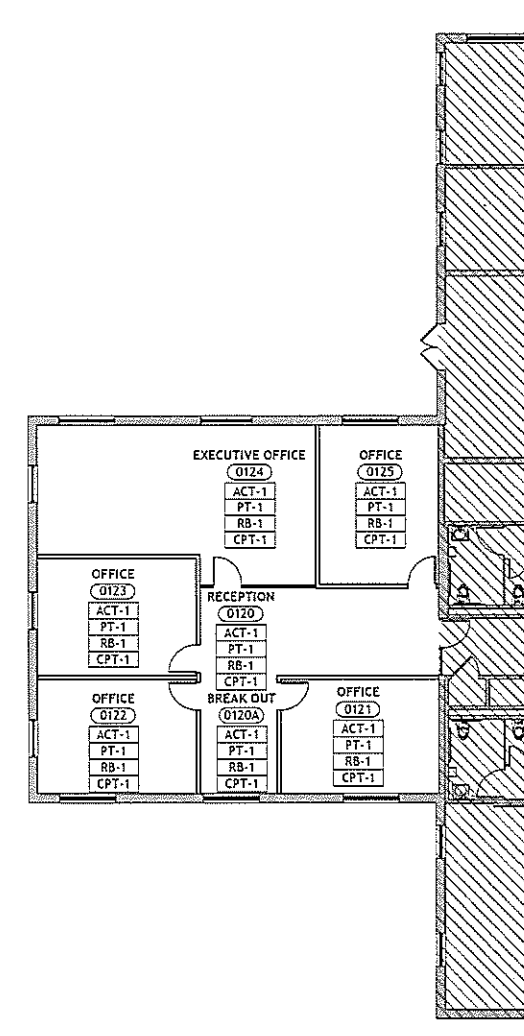
	EXISTING WALLS
	WALLS TO BE REMOVED
	NEW CONSTRUCTION



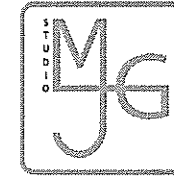
1 ARCHITECTURAL PARTITION TYPE FLOOR PLAN - PHASE - 2
1/8" = 1'-0"



2 ARCHITECTURAL DIMENSION FLOOR PLAN - PHASE - 2
1/8" = 1'-0"



3 ARCHITECTURAL FINISH FLOOR PLAN - PHASE - 2
1/8" = 1'-0"



STUDIO M.J.G. LLC
5106 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 RENOVATION -
PHASE - 2**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

100% CONSTRUCTION
DOCUMENTS

Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE

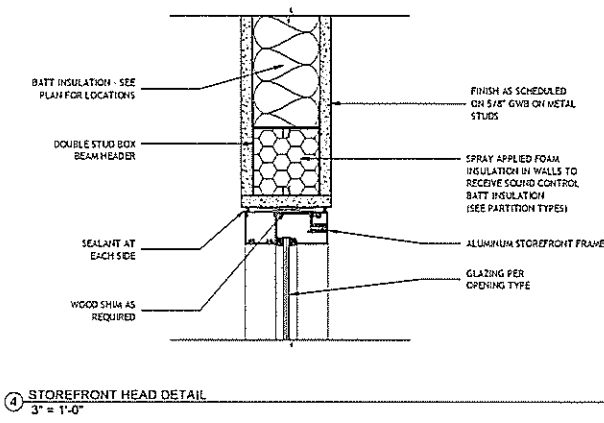
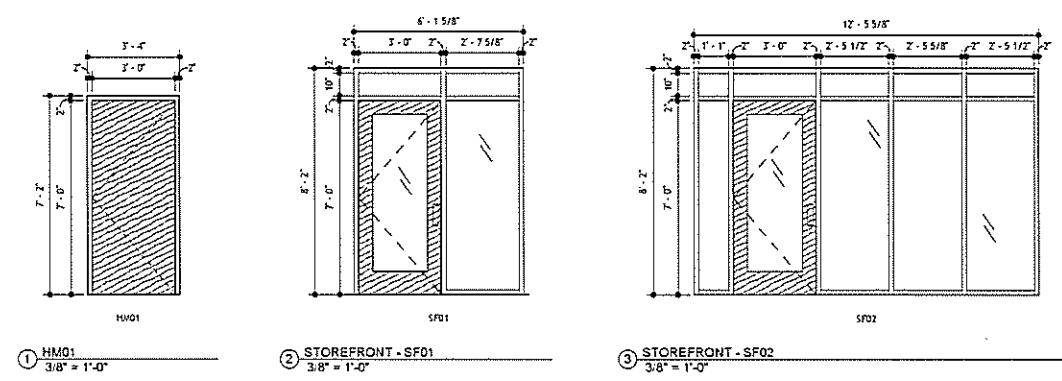
PROJECT NUMBER: 17016
ISSUE DATE: 18 AUGUST 2017
CREATED BY: AAR
CHECKED BY: AAR

A510
ARCHITECTURAL
OPENING SCHEDULE,
TYPES, AND DETAILS

8/17/2017 2:00:50 PM

NUMBER	WIDTH	HEIGHT	DOOR	FRAME	OPENING TYPE	FIRE RATING	NOTES
120.1	3'-0"	7'-0"	FLUSH WOOD W/ FULL LITE	ALUMINUM STOREFRONT	SF01	-	
121.1	3'-0"	7'-0"	FLUSH WOOD	HOLLOW METAL	HM01	-	
122.1	3'-0"	7'-0"	FLUSH WOOD	HOLLOW METAL	HM01	-	
123.1	3'-0"	7'-0"	FLUSH WOOD	HOLLOW METAL	HM01	-	
124.1	3'-0"	7'-0"	FLUSH WOOD W/ FULL LITE	ALUMINUM STOREFRONT	SF02	-	
125.1	3'-0"	7'-0"	FLUSH WOOD	HOLLOW METAL	HM01	-	

- NOTES:
1. ALL HEAD, JAMB AND SILL FRAMING SHALL BE 16 GAUGE
 2. ALL HOLLOW METAL FRAMES SHALL BE BACK PAINTED AND GROUTED SOLID PRIOR TO INSTALL
 3. ALL BOX BEAM HEADERS AND DOUBLE STUD JAMBS SHALL RECEIVE SPRAY FOAM INSULATION

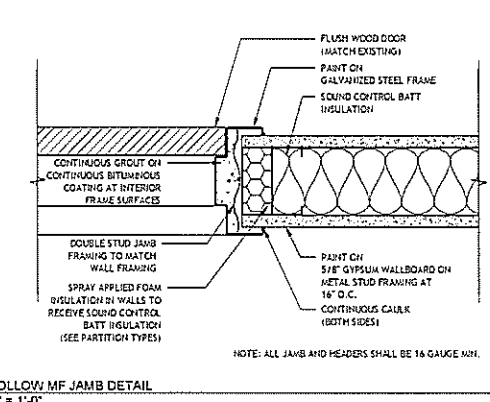
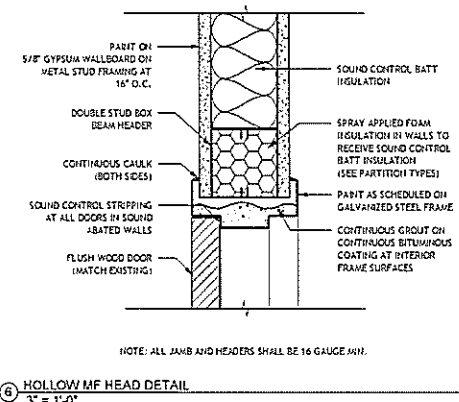
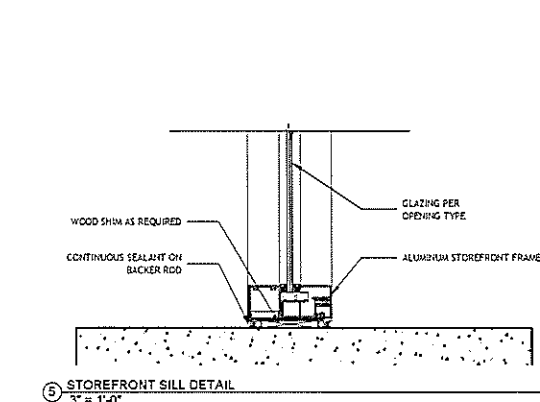


1 HM01
3'-0" x 7'-0"

2 STOREFRONT - SF01
3'-0" x 7'-0"

3 STOREFRONT - SF02
3'-0" x 7'-0"

4 STOREFRONT HEAD DETAIL
3" x 1'-0"



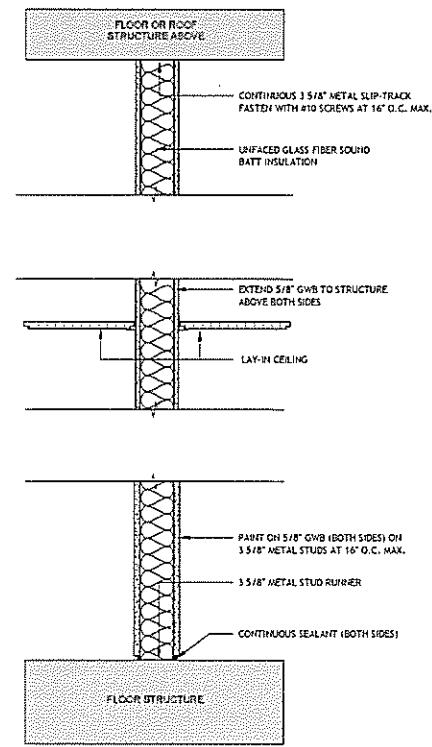
5 STOREFRONT SILL DETAIL
3" x 1'-0"

6 HOLLOW MF HEAD DETAIL
3" x 1'-0"

7 HOLLOW MF JAMB DETAIL
3" x 1'-0"

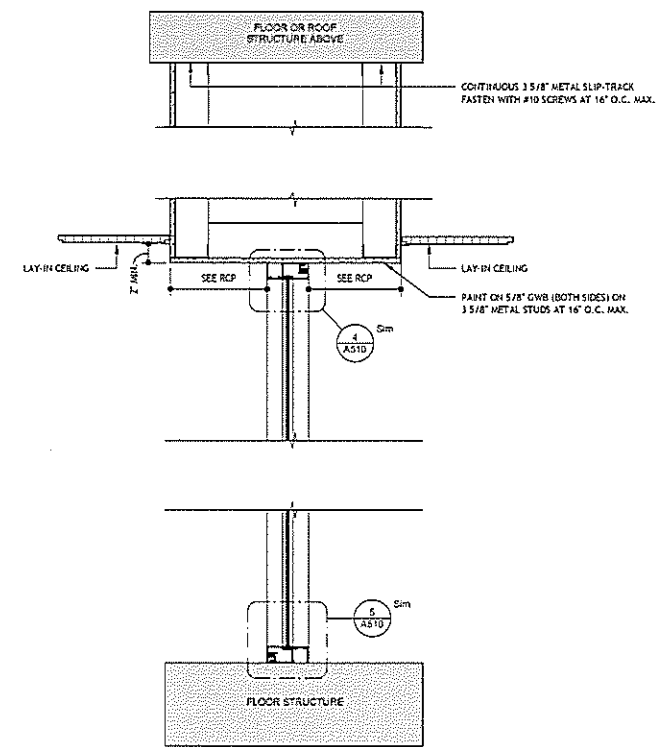
NOTE: ALL JAMB AND HEADERS SHALL BE 16 GAUGE MIN.

NOTE: ALL JAMB AND HEADERS SHALL BE 16 GAUGE MIN.



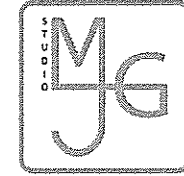
MS01

1 INTERIOR PARTITION TYPE - MS01
1 1/2" = 1'-0"



MS02

2 INTERIOR PARTITION TYPE - MS02
1 1/2" = 1'-0"



STUDIO M.J.G. LLC
5106 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 RENOVATION -
PHASE - 2**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

100% CONSTRUCTION
DOCUMENTS

Michael J. Gilfilen
Digitally signed by Michael J. Gilfilen
 DN: cn=Michael J. Gilfilen, o=STUDIO M.J.G. LLC, email=mgilfilen@studiomjg.com, c=US
 Reason: I am approving the document
 Date: 2017.08.21 15:22:01 -05'

Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE

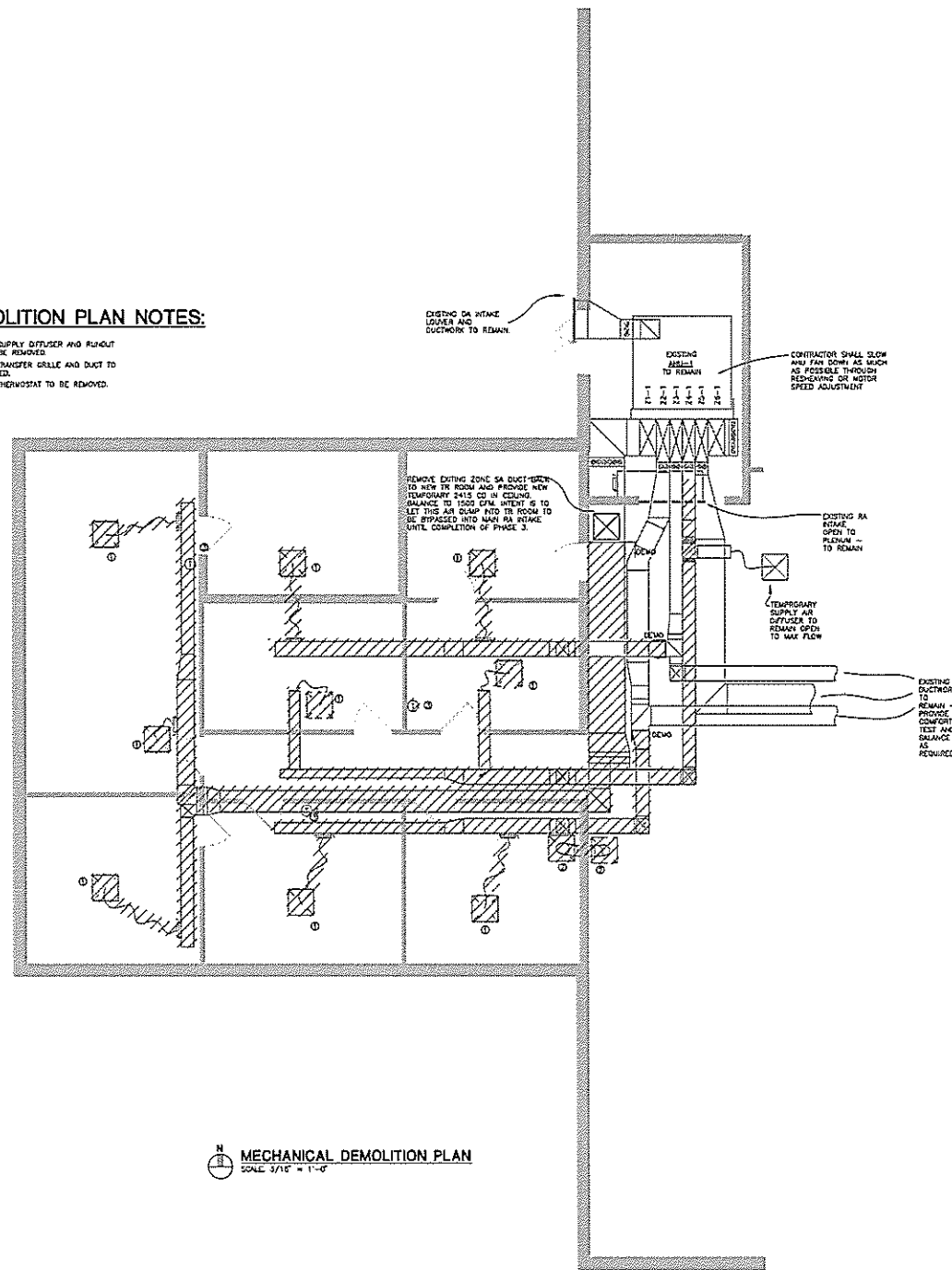
PROJECT NUMBER: 17019
 ISSUE DATE: 18 AUGUST 2017
 CREATED BY: MAJ
 CHECKED BY: MAJ

A610
 ARCHITECTURAL
 INTERIOR PARTITION
 TYPES

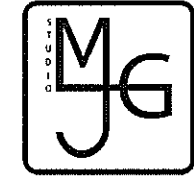
8/21/2017 2:00:31 PM

DEMOLITION PLAN NOTES:

- ① EXISTING SUPPLY DIFFUSER AND RUNOUT DUCT TO BE REMOVED
- ② EXISTING TRANSFER GRILLE AND DUCT TO BE REMOVED
- ③ EXISTING THERMOSTAT TO BE REMOVED



MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"



STUDIO M.G. LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMG.COM

**MP02649 BUILDING 700 - PHASE 2
RENOVATION**

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

100% CONSTRUCTION DOCUMENTS

KEVIN M. SPELLICY
PE - 76968

No.	DESCRIPTION	DATE

PROJECT NUMBER:	17032
ISSUE DATE:	8/18/2017
CREATED BY:	AKF
CHECKED BY:	KAS

M101

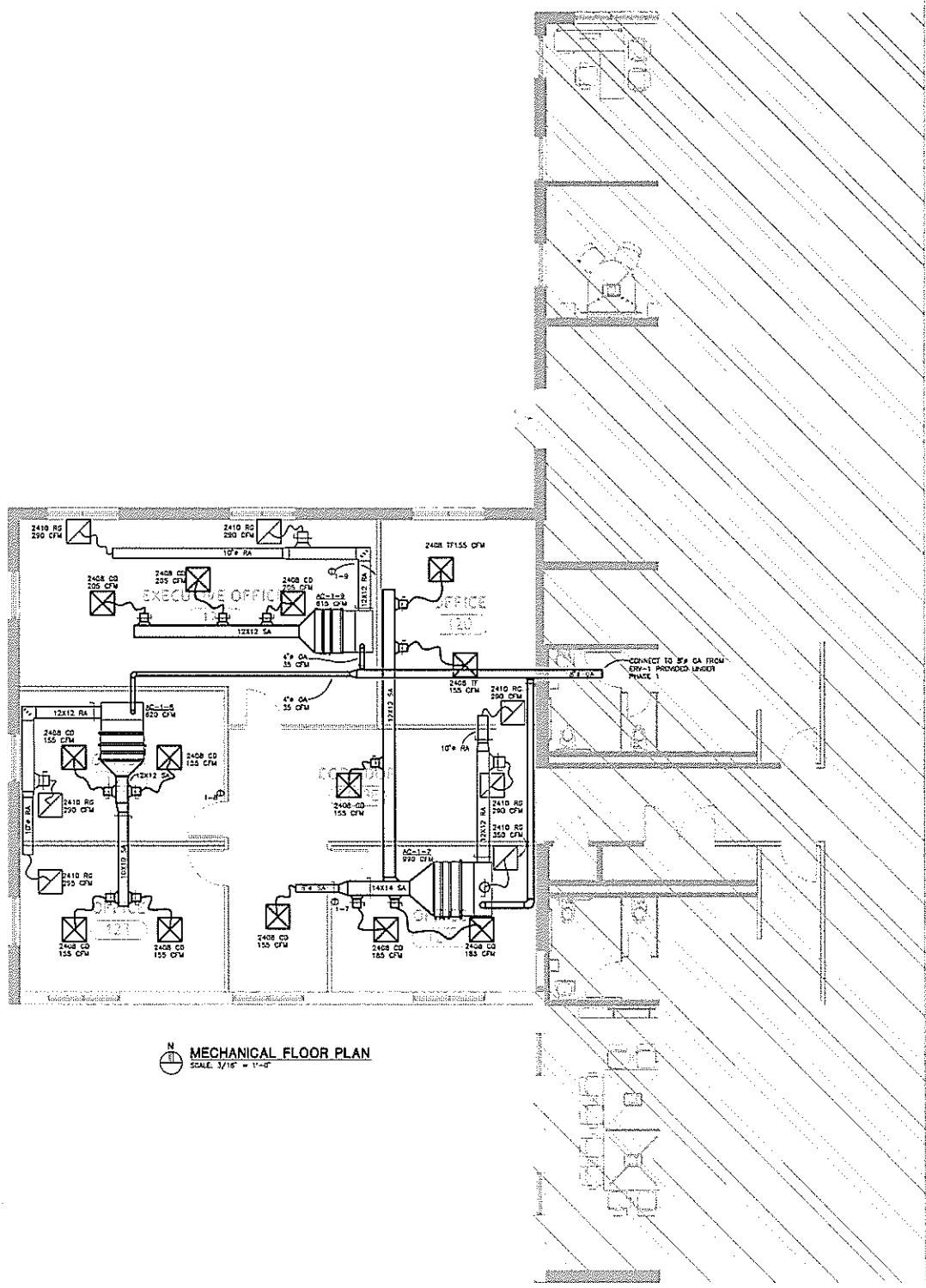
MECHANICAL
DEMOLITION
FLOOR PLAN



3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 • Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 05552813

PROJECT: 17032

100% CONSTRUCTION DOCUMENTS



MECHANICAL FLOOR PLAN
SCALE: 3/16" = 1'-0"



STUDIO M&G, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMGLG.COM

**MP02649 BUILDING 700 - PHASE 2
RENOVATION**

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

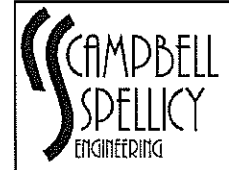
100% CONSTRUCTION
DOCUMENTS

KEVIN M. SPELICY
PE - 76968

NO.	DESCRIPTION	DATE

PROJECT NUMBER:	17032
ISSUE DATE:	8/18/2017
CREATED BY:	ATF
CHECKED BY:	KMS

M201
MECHANICAL
FLOOR PLAN



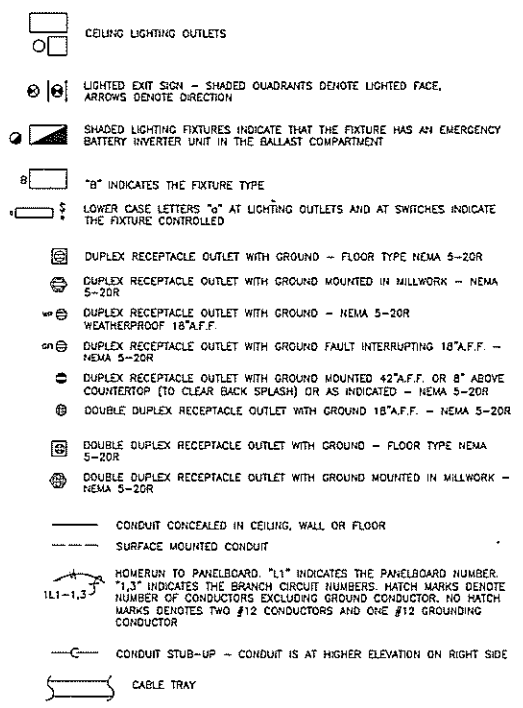
3720 NW 43rd Street, Suite 109
Gainesville, Florida 32609
Phone: 352-372-6567 Fax: 352-372-7232
www.CampbellSpelicy.com
Certificate of Authorization: 00029013

PROJECT: 17032

100% CONSTRUCTION DOCUMENTS

ELECTRICAL LEGEND

- Fire alarm pull station mounted 48" A.F.F.
Fire alarm horn mounted at least 90" A.F.F. and at least 5' below finished ceiling measured to top of device.
Fire alarm flashing light mounted 90-1/2" A.F.F. to the bottom of the lens, unless indicated in a ceiling, strobe shall be rated for minimum of 7500.
Fire alarm horn and flashing light mounted 80-1/2" A.F.F. to the bottom of the lens, unless indicated in a ceiling, strobe shall be rated for minimum of 7500.
Smoke detector - "D" denotes sampling tubes in air conditioning ductwork.
Fire alarm annunciator.
Fire alarm control panel.
Meter.
Relay.
Data/telephone outlet - wall.
Data/telephone outlet - floor.
Data/telephone outlet - mounted in millwork.
Distribution switchboard or panelboard.
Branch circuit panelboard.
Disconnect switch - poles, rating and fusing as indicated.
Equipment connection outlet.
Junction box.
Wall mounted occupancy sensor with both passive infrared (PIR) detection and ultrasonic sound detection (microphones) dual technology, wall mounted sensors shall be at normal wall switch mounting height.
Low-voltage ceiling-mounted or corner-mounted, as specified on drawing, occupancy sensor with both passive infrared (PIR) detection and ultrasonic sound detection (microphones) dual technology, use low-voltage type with power packs with 20 amp rating as necessary per manufacturer's instructions.
Single pole switch 47-1/2" A.F.F. or as indicated.
3-way switch 47-1/2" A.F.F. or as indicated.
Dimmer with ON/OFF switch 47-1/2" A.F.F. or as indicated.



ELECTRICAL ABBREVIATIONS

Table listing electrical abbreviations such as AC (Air Conditioning Unit), AFF (Above Finished Floor), AHJ (Air Handling Unit), AICS (Amps Interrupting Capacity Symmetrical), and others.

ELECTRICAL NOTES

- All materials and labor provided shall comply with requirements of the 2014 Edition of the Florida Building Code with all adopted amendments.
All branch circuits shall be provided with an independent and separate grounded conductor (neutral) which is not shared by any other circuits, unless the branch circuits which share the same neutral all supply the same individual electrical load such as the same 3-phase motor.
Where two switches are shown controlling three or four lamp fixtures, the inside lamps of each fixture shall be on one switch (or circuit) and the outside lamps of each fixture shall be on the other switch (or circuit).
Coordinate locations of electrical equipment, devices, outlets, fixtures, etc. with architectural plans, elevations, and reflected ceiling plans prior to rough-in work. Do not scale electrical drawings.
Install all ceiling mounted speakers to avoid conflicts with air devices, lights, sprinklers, etc.
Install 4' x 4' and 2' x 2' fixture such that lamps are parallel in same visual area.
There shall be no wall outlets installed back to back, offset twelve inches minimum.
All wire shall be copper.
Install 1" conduit (or size as indicated) from each telephone outlet to the nearest telephone backboard or cabinet.
Stub and cap three 3/4" empty conduits to above ceiling from each recessed mounted panelboard. These conduits shall be accessible for future circuit installation.
All raceway for the fire alarm system shall be red and shall be 3/4" conduit minimum.
Unless indicated otherwise, communication boxes shall be 4-11/16" x 4-11/16" x 2-1/8" deep with single device cover plates.
Receptacles and cover plates connected to the emergency system shall be colored red.
Provide an insulated grounding conductor in all feeder and branch circuits.
Provide a 6"-0" maximum flexible connection from each recessed lighting fixture to junction box above ceiling.
Contractor shall provide materials and labor necessary to properly recycle (if possible) or otherwise to properly dispose of all existing electrical items (lights, clocks, speakers, etc.) that have been removed and not reinstated - unless stated otherwise by owner.
Remove all unused existing exposed conduit, wire, and boxes. Pull out all wire from existing concealed conduit that has been abandoned.
Drawings may indicate the reuse of some existing outlet boxes or raceway, where it is impractical or non-compliant with the NEC because of job conditions to reuse an outlet box or raceway, contractor shall provide new outlet box or raceway as required.
Contractor shall repair - to original condition to owner's satisfaction - any existing wall, floor, ceiling, or other existing items removed, altered, or damaged during construction.
In order to minimize ballast quantity, tandem wiring of fixture ballasts shall be used wherever practical due to fixture proximity, when double switching is used for lighting fixtures. Also, even if double switching is not indicated, whenever two or more one or three-lamp lighting fixtures in the same space are indicated as being controlled by the same switch or switches, tandem wiring of fixture ballasts shall be used if required by Florida Building Code 505.3 (2010 ED). See the exceptions for this code requirement in this portion of the Florida Building Code.
Mounting tolerances for fire alarm devices is +/-1/2".
Remove existing electrical equipment only as indicated. Provide materials and labor necessary to maintain existing electrical power or communications supplies to equipment, devices, fixtures, or other existing items to remain.
Replace existing receptacles not conforming with N.E.C. with applicable NEMA grounding type.
If existing fixtures are relocated or affected, affected fixtures shall be stored safely, cleaned, and shall have new ballasts, lenses, and lamps provided, as necessary.
The contractor shall reroute existing circuits or provide new circuits as required to maintain electrical power or communications supplies to fixtures, devices, outlets, or other existing items to remain which are supplied by items to be removed or relocated.
Division 16 design provides a number of branch circuits, phases, ampacity, and overcurrent protection devices for design-basis equipment (provided by Division 15 or other divisions of this contract) conforming to manufacturer's specifications and requirements available at time of design. If requirements of equipment actually provided under contract for construction are different, contractor shall make all changes required without increase in the contract amount or time schedule. Such changes required may include - but shall not be limited to - quantity and size of wires, quantity and size of conduits, and quantity, type, and size of circuit breakers, fuse protection, and disconnect switches. Division 16 system shall comply with requirements of equipment provided by other divisions of this contract even if different from design-basis requirements.

DEMOLITION NOTES

- Contractor shall provide materials and labor as necessary to remove all electrical items indicated as existing to be removed; to remove, store, clean, and reinstall all electrical items indicated as existing to be relocated; and to not disturb any other electrical items except as necessary to accommodate other work specified. All existing devices, structures, equipment or other features shall be considered to be existing to remain unless specifically indicated otherwise.
Contractor shall provide materials and labor as necessary to protect any existing or new smoke detectors, if any, during demolition and construction to ensure no particulate matter may enter these detectors.
Contractor shall provide materials and labor as necessary and shall schedule work as necessary to ensure that outages to the service of fire alarm devices are minimized. All outages to such fire alarm system components, if any, shall be coordinated with the owner and conducted during times specified by owner. See project manual Division One.
Contractor shall provide materials and labor as necessary to maintain in service during demolition and construction those existing fire alarm system components which are outside the renovation area even if these components are supplied by or served by materials to be removed, materials to be relocated, or other materials within the renovation area.
Contractor shall remove all unused conductors back to source or to the first junction point supplying existing or new loads to remain.
Contractor shall provide all materials and labor necessary to resupply or to maintain in service - to the original condition, to the satisfaction of the owner and the engineer - any electrical items outside of the renovation area which are served by or supplied by electrical items within the renovation area.
All exposed unused conduit shall be removed. All unused concealed conduit shall be abandoned in place after installing a pullstring.
Devices shown inside the renovation area are not intended to represent all devices within space. Additional demolition work may be required for installing new work. Contractor shall assume additional items not indicated are present and shall thoroughly inspect project area prior to bidding.
Contractor shall provide materials and labor as necessary to repair or to replace - to the original condition, to the satisfaction of the owner and the engineer - any existing devices, finishes, surfaces, or equipment to remain which is damaged during demolition or construction with no change to the contract amount or time schedule.
Contractor shall provide materials and labor as necessary to extend, relocate, add to, or replace (as necessary) fire alarm and power conduits and conductors in order to accommodate relocation, removal, or reinstallation of any electrical items which are so indicated.
Demolition shall include any removal and replacement of existing materials to make provision for new finishes if required to accommodate work by other divisions of this contract.
Contractor shall provide materials and labor necessary to perform electrical demolition necessary to accommodate architectural work specified on demolition sheet. Coordinate exact requirements with architectural documents and field conditions prior to bid.

CAMPBELL SPELLEY ENGINEERING logo and contact information: 3720 NW 43rd Street, Suite 109, Gainesville, Florida 32606. Phone: 352-372-6967. Fax: 352-372-7232. www.CampbellSpelley.com. Conficate of Authorization: 0009813. PROJECT: ### 100% CONSTRUCTION DOCUMENTS



STUDIO M&J, LLC
3211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIAM&J.COM

MP02649 BUILDING 700 - PHASE 2 RENOVATION
University of Florida, 2001 McCarty Dr., Gainesville, FL 32611

100% CONSTRUCTION DOCUMENTS

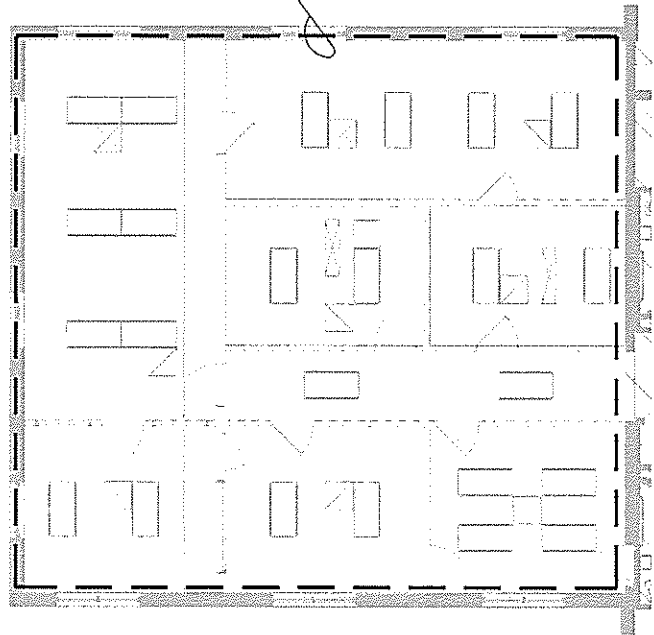
TIMOTHY W. SMITH
PE - 64454

Table with columns: No., DESCRIPTION, DATE. It is mostly empty.

Table with columns: PROJECT NUMBER, ISSUE DATE, CREATED BY, CHECKED BY. Values: ###, [BLANK], JSA, TWS.

E001
ELECTRICAL LEGEND, NOTES, AND ABBREVIATIONS

LIMITS OF ELECTRICAL DEMOLITION
 PROVIDE MATERIALS AND LABOR NECESSARY TO REMOVE ALL ELECTRICAL DEVICES AND LIGHTING FIXTURES FROM THIS AREA AS NECESSARY TO ACCOMMODATE DEMOLITION AND NEW CONSTRUCTION. UNO. COORDINATE WITH FIELD CONDITIONS PRIOR TO PRICING. ALL UNUSED CONDUIT AND CONDUCTORS SHALL BE REMOVED BACK TO FIRST JUNCTION BOX SUPPLYING LOADS TO REMAIN OR BACK TO PANEL BOARD. REMOVE ALL EXISTING FIRE ALARM DEVICES BUT DO NOT REMOVE CONDUCTORS AND CONDUIT SUPPLYING THOSE FIRE ALARM DEVICES. CONDUCTORS AND CONDUIT SHALL BE EXTENDED TO SUPPLY NEW DEVICES; COORDINATE WITH SHEET E2.1



ELECTRICAL PARTIAL DEMOLITION FLOOR PLAN
 SCALE: 3/16" = 1'-0"

PNL - P33 (NEW PER PHASE 1) 60A MLO SCR : 22 KAIC PPD BLDG 700									
CKT	LOAD	P	T	R	PHASE LOAD AMP			CKT BKR	SURFACE MNTD
					A	B	C		
1					10.0	5.8			2
3						10.0	7.5		4
5							10.0	7.5	2/15
7					10.0	0.0			8
9						3.5	0.0		10
11	AC-2-1						0.0	0.0	
13					5.0	0.0			12
15							0.0	0.0	
17							0.0	0.0	
19					0.0	0.0			20
21							0.0	0.0	
23									22
25									24
27									26
29									28
31									30
33									32
35									34
37									36
39									38
41									40
42									42

NOTES:
 * AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS

AMP CONNECTED: 24.3
 DEMAND: 24.1

LOAD DESCRIPTION	PANEL UNDER PANEL NAME			
	A	B	C	V
+ METERED LOAD				120
+ EXISTING LOAD				50.6
- LOAD BEING REMOVED (-)	119	123	125	120
LOAD BEING ADDED (+)	188	202	139	120
RESULTANT LOAD	259.5	212.5	214.5	120
CALCULATED OPENED TO LOW VOLTAGE	212.5			76.5
RATED PANEL CAPACITY (AMPS)	400			153

FROM METERING DATA
 CALCULATED USING AS-BUILT DRAWINGS AND PANEL DIRECTORIES
 NO UPGRADES TO DISTRIBUTION PANEL OR TRANSFORMER REQUIRED

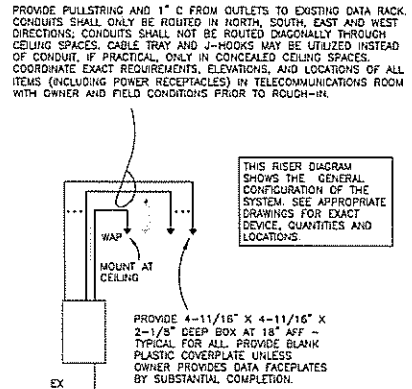
LOAD SUMMARY TABLE

PNL - PB4 (NEW PER PHASE 1) 100A MLO SCR : 22 KAIC PPD BLDG 700									
CKT	LOAD	P	T	R	PHASE LOAD AMP			CKT BKR	SURFACE MNTD
					A	B	C		
1					4.5	12.0			2
3						3.0	3.0		4
5							0.0	36.0	6
7	RM 120 RCPT				7.5	0.0			8
9	RM 120 RCPT					5.0	0.0		10
11	RM 121 RCPT						0.0		12
13	RM 122 RCPT				7.5	0.0			14
15	RM 123 RCPT					7.5	0.0		16
17	RM 124 RCPT						0.0	0.0	18
19					0.0	0.0			20
21							0.0	0.0	22
23									24
25					0.0	0.0			26
27							0.0	0.0	28
29									30
31					0.0	0.0			32
33							0.0	0.0	34
35									36
37					2.0	0.0			38
39							0.0	0.0	40
41							0.0	0.0	42

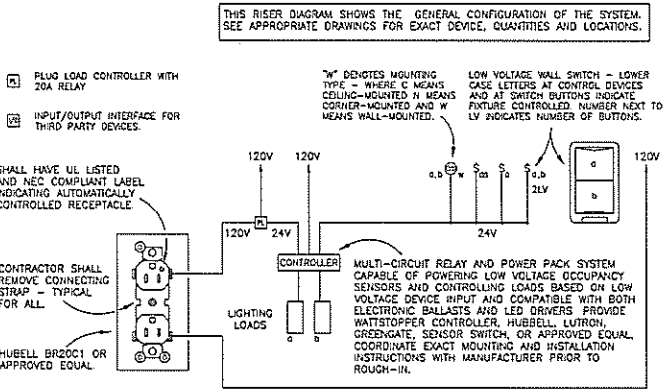
NOTES:
 * AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS

AMP CONNECTED: 47.3
 DEMAND: 45.1

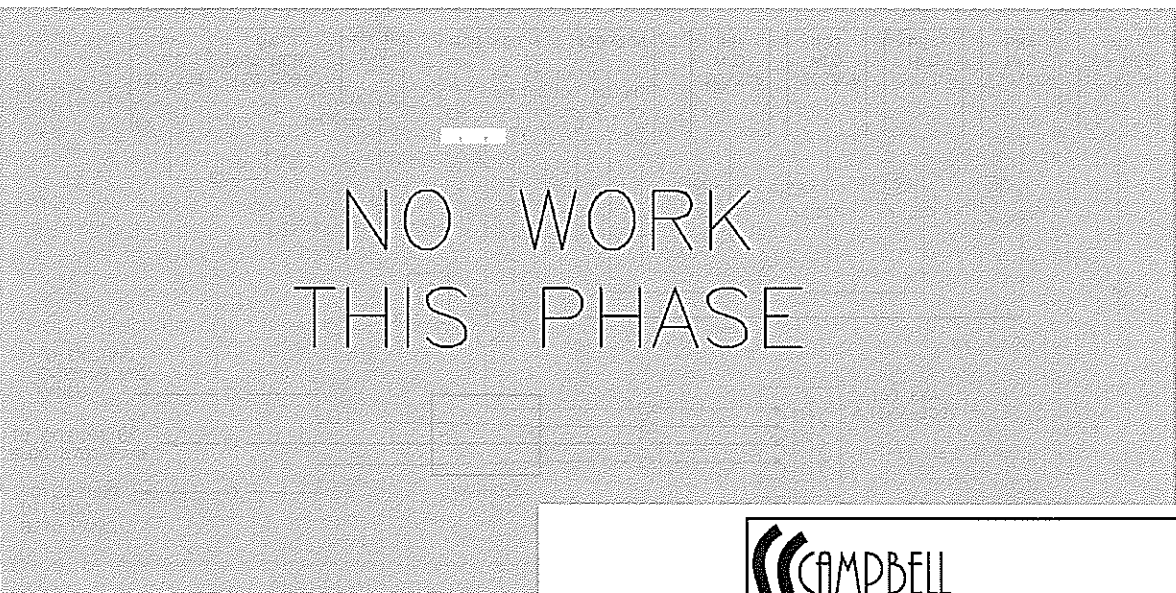
AMP CONNECTED: 47.3
 DEMAND: 45.1



TELECOMMUNICATIONS PARTIAL RISER DIAGRAM
 NOT TO SCALE



AUTOMATIC RECEPTACLE AND LIGHTING CONTROL DETAIL
 NOT TO SCALE



POWER DISTRIBUTION ONE LINE DIAGRAM
 NOT TO SCALE

CAMPBELL SPELLEY ENGINEERING
 3720 NW 43rd Street, Suite 100
 Gainesville, Florida 32606
 Phone: 352-372-6567 Fax: 352-372-7232
 www.CampbellSpelley.com
 Certificate of Authorization: 00000813

PROJECT: ###



STUDIO JG, LLC
 5211 SW 91ST TERRACE, SUITE F
 GAINESVILLE, FLORIDA 32608
 WWW.STUDIOJG.COM

MP02649 BUILDING 700 - PHASE 2
RENOVATION
 University of Florida, 2001
 McCarty Dr., Gainesville, FL 32611

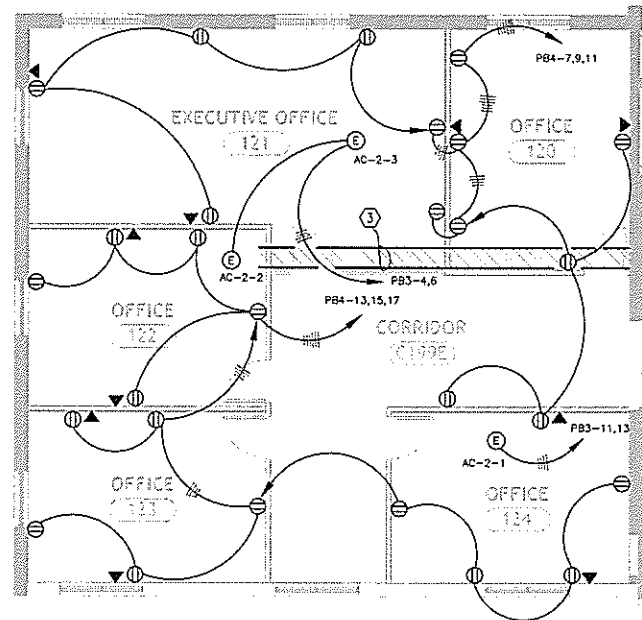
100% CONSTRUCTION DOCUMENTS

TIMOTHY W. SMITH
 PE - 64454

No.	DESCRIPTION	DATE

PROJECT NUMBER: ###
 ISSUE DATE: (INSERT DATE)
 CREATED BY: JSA
 C-CHECKED BY: TWS

E101
 ELECTRICAL DEMO FLOOR PLAN, PANEL SCHEDULE & RISERS

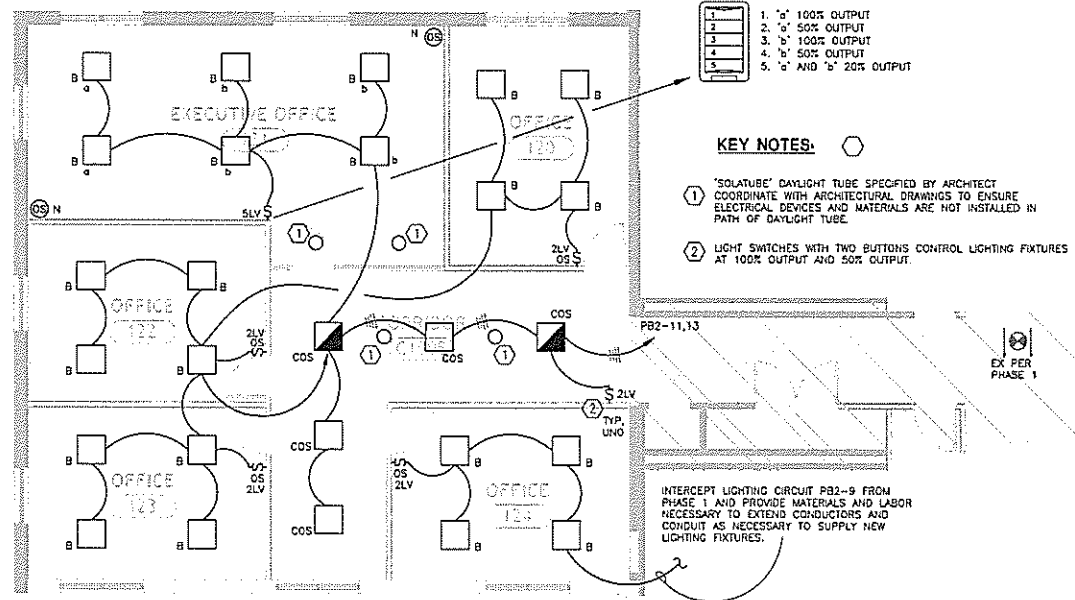


REQ.	CONDUCTORS	CIRCUIT SIZE	DISCONNECT
AC-2-1	3#12, 1#12 GRD	1/2"	BY DIVISION 23
AC-2-2	3#12, 1#12 GRD	1/2"	BY DIVISION 23
AC-2-3	3#12, 1#12 GRD	1/2"	BY DIVISION 23

KEY NOTES:

- 3 PROVIDE 14" MINIMUM WIDTH CABLE TRAY ABOVE CEILING WITH 1" C BONDED TO TRAY AND EXTENDED TO THE WORK AREA OUTLET BOX. COORDINATE EXACT LOCATION AND LENGTH OF TRAY WITH FIELD CONDITIONS AND UF INFORMATION TECHNOLOGY DEPT PRIOR TO ORDERING.

PARTIAL ELECTRICAL FLOOR PLAN - POWER
SCALE: 3/16" = 1'-0"



- 1. "a" 100% OUTPUT
- 2. "b" 50% OUTPUT
- 3. "c" 100% OUTPUT
- 4. "d" 50% OUTPUT
- 5. "a" AND "b" 20% OUTPUT

KEY NOTES:

- 1 "SOLATUBE" DAYLIGHT TUBE SPECIFIED BY ARCHITECT COORDINATE WITH ARCHITECTURAL DRAWINGS TO ENSURE ELECTRICAL DEVICES AND MATERIALS ARE NOT INSTALLED IN PATH OF DAYLIGHT TUBE.
- 2 LIGHT SWITCHES WITH TWO BUTTONS CONTROL LIGHTING FIXTURES AT 100% OUTPUT AND 50% OUTPUT.

PARTIAL ELECTRICAL FLOOR PLAN - LIGHTING
SCALE: 3/16" = 1'-0"

TYPE	DESCRIPTION
A	6" RECESSED ROUND LED DOWN LIGHT WITH AT LEAST 18 GAUGE GALVANIZED STEEL HOUSING, SELF FLANGED TRIM WITH CLEAR LOW IRIDESCENT REFLECTOR (OR AS SELECTED BY ARCHITECT), 1,750 MINIMUM OUTPUT LUMEN, 4000K CCT, MINIMUM 80 CRI, NO LESS THAN 50° BEAM SPREAD, 120V OR UNIVERSAL VOLTAGE, NON-DIMMING DRIVER AND INTEGRAL EMERGENCY BATTERY PACKS AS INDICATED ON DRAWINGS.
B	2'x4' RECESSED LED TROFFER FIXTURE WITH DIE FORMED 22-GAUGE COLD ROLLED STEEL, FROSTED ACRYLIC SHIELDING, MINIMUM 2,000 OUTPUT LUMENS, 4000K CCT, NON-GLARE FINISH WITH WHITE COLOR OR AS SELECTED BY ARCHITECT, MOUNTING TYPE AS NECESSARY TO ACCOMMODATE CEILING TYPE SPECIFIED, 120V OR UNIVERSAL VOLTAGE WITH 0-10V DIMMING DRIVER.
COS	H.E. WILLIAMS LT-22-L22/B40-AF SERIES, PHILLIPS-DAYBRITE FLUXGRID SERIES, COLUMBIA LIGHTING LSER22-40-ED-U SERIES OR FOR MANUFACTURERS NOT LISTED, COMPLY WITH "REQUEST FOR SUBSTITUTION" SECTION IN ELECTRICAL SPECIFICATIONS BOOK; ONLY PROPOSED FIXTURES SUBMITTED (14) BUSINESS DAYS PRIOR TO PRICING WILL BE REVIEWED.
	SHALL BE THE SAME AS TYPE B, EXCEPT WITH INTEGRAL OCCUPANCY/DAYLIGHT SENSOR AND 3,500 LUMEN OUTPUT. PROVIDE INTEGRAL EMERGENCY BACKUP DRIVER WHERE INDICATED ON DRAWINGS.
	ADD H.E. WILLIAMS OCC OPTION, PHILLIPS DAYCC SENSOR, OR COLUMBIA GW SENSOR AS APPLICABLE.
X	WALL OR CEILING MOUNTED LED EXIT SIGN WITH DIE-CAST ALUMINUM HOUSING, A BLACK FINISH, SIGN SHALL HAVE 6" HIGH RED LETTERS ON A BRUSHED ALUMINUM FACEPLATE. PROVIDE SINGLE OR DOUBLE FACE SIGN WITH DIRECTIONAL ARROWS AS INDICATED ON THE DRAWINGS. SOLID STATE AND BATTERY BACKUP.
	BEGHELLI, CHLORIDE, LEGION LIGHTING OR FOR MANUFACTURERS NOT LISTED, SUBMIT PROPOSED FIXTURES TO THE ENGINEER (14) BUSINESS DAYS PRIOR TO BID DATE FOR REVIEW.

PROGRAMMING NOTES	ZONE CONTROLLED & DESIGNATION
1 100% OUTPUT AUTO-ON	RM. 121 LETTER "a" 1 4 5 6
2 100% OUTPUT MANUAL-ON	RM. 121 LETTER "b" 2 4 5 6
3 50% OUTPUT AUTO-ON	OFFICE 120 2 4 6
4 50% MANUAL-ON	OFFICE 122 2 4 6
5 20% MANUAL-ON	OFFICE 123 2 4 6
6 100% OUTPUT AUTO-OFF 20 MINUTE TIME DELAY	OFFICE 124 2 4 6
7 100% OUTPUT MANUAL-OFF	ALL CORRIDORS 2 7
8 MANUAL DIMMING	

CAMPBELL SPELLICY ENGINEERING
3720 NW 43rd Street, Suite 109
Gainesville, Florida 32606
Phone: 352-372-6967 Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00009813

PROJECT: 17032 100% CONSTRUCTION DOCUMENTS



STUCKI MFG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUCKIMFG.COM

**MP02649 BUILDING 700 - PHASE 2
RENOVATION**
University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

100% CONSTRUCTION DOCUMENTS

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE

PROJECT NUMBER:	17032
ISSUE DATE:	8/18/2017
CREATED BY:	JSA
CHECKED BY:	TWS

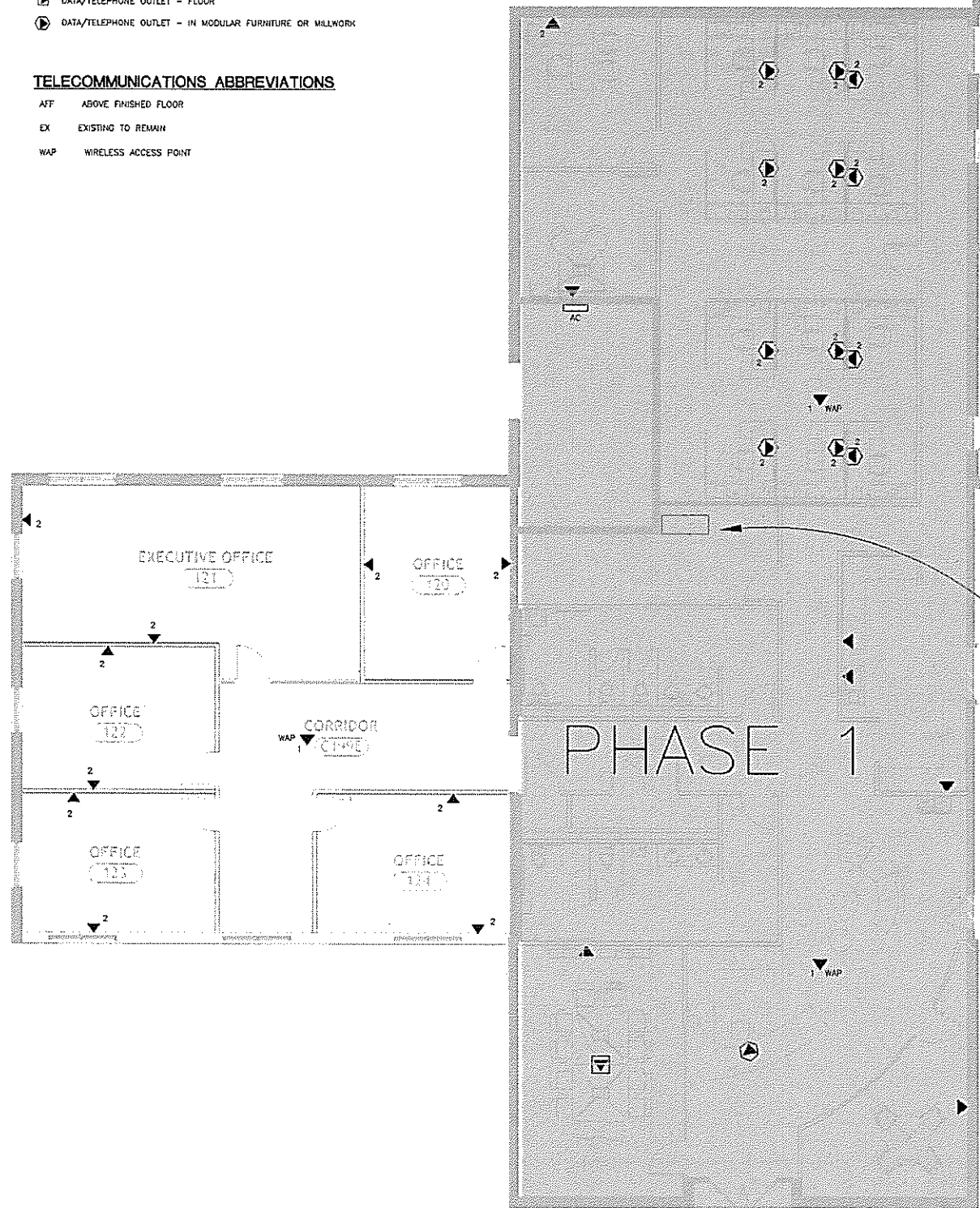
E201
ELECTRICAL POWER & LIGHTING FLOOR PLANS

TELECOMMUNICATIONS LEGEND

- ⊠ DATA/TELEPHONE OUTLET - WALL
- ⊡ DATA/TELEPHONE OUTLET - FLOOR
- ⊙ DATA/TELEPHONE OUTLET - IN MODULAR FURNITURE OR MILLWORK

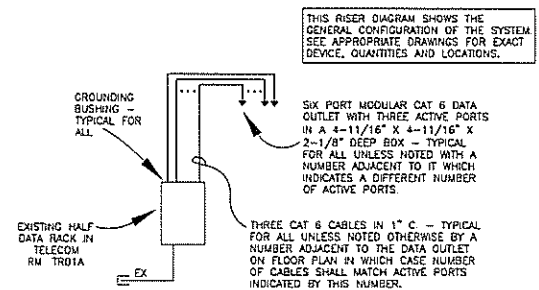
TELECOMMUNICATIONS ABBREVIATIONS

- AFF ABOVE FINISHED FLOOR
- EX EXISTING TO REMAIN
- WAP WIRELESS ACCESS POINT



ALL TELECOMMUNICATIONS WORK SHALL COMPLY WITH CATEGORY 6 STANDARDS AND WITH UF CONSTRUCTION STANDARDS REGARDING TELECOMMUNICATIONS.

EXISTING HALF DATA RACK. ONLY TWO SPARE PORTS WERE OBSERVED PRIOR TO DEMOLITION WORK. VERIFY EXACT COUNT.



TELECOMMUNICATIONS PARTIAL RISER DIAGRAM
NOT TO SCALE

TELECOMMUNICATIONS PARTIAL TELECOMMUNICATIONS FLOOR PLAN
SCALE: 3/16" = 1'-0"



STUDIO M.J.G. LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32604
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - PHASE 2
RENOVATION**

University of Florida, 2001
McCarty Dr, Gainesville, FL 32611

100% CONSTRUCTION DOCUMENTS

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE

PROJECT NUMBER: 17032
ISSUE DATE: 8/18/2017
CREATED BY:
CHECKED BY:

T101

TELECOMM FLOOR PLAN, LEGEND, & RISER

**CAMPBELL
SPELLEY
ENGINEERING**

3720 NW 42nd Street, Suite 100
Gainesville, Florida 32606
Phone: 352-372-5207 / Fax: 352-372-7232
www.CampbellSpelley.com
Certificate of Authorization: 05099913

PROJECT: 17032 100% CONSTRUCTION DOCUMENTS



5206 SW 91st Terrace, Suite A
Gainesville, FL 32608
352.226.8061
www.studiomjg.com

DATE: August 18, 2017
FIELD ORDER NO: ONE (1)
TO:

PROJECT: MP02649 Bldg 700 Renovation Phase 1
OWNER: University of Florida
Project Manager: Joe Garcia
STUDIO MJG, llc. No: 17016

You are hereby directed to execute promptly this Field Order, which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

DESCRIPTION: This field order makes changes to the Phase 1 documents to coordinate with the Phase 2 Renovation.

- F1-1. SPECIFICATIONS SECTION 09 68 13 CARPET TILE:** Revise paragraph 1.1 C as noted below.
C. Color: Image 26557
- F1-2. SPECIFICATIONS SECTION 09 91 23 INTERIOR PAINTING:** Revise paragraph 2.2 C 2 Color, Wall Paint, Accent Paint as noted below.
C. Colors:
2. Wall Paint, Accent Paint (PT-2): Major Blue SW 6795
- F1-3. DRAWINGS: Sheet M001– MECHANICAL LEGEND, NOTES, DETAILS AND SCHEDULES:** Replace this sheet in its entirety with the attached sheet M001 dated August 18, 2017.
- F1-4. DRAWINGS: Sheet M101– MECHANICAL DEMOLITION FLOOR PLAN:** Replace this sheet in its entirety with the attached sheet M101 dated August 18, 2017.
- F1-5. DRAWINGS: Sheet M201– MECHANICAL FLOOR PLAN:** Replace this sheet in its entirety with the attached sheet M201 dated August 18, 2017.
- F1-6. DRAWINGS: Sheet P001– PLUMBING LEGEND, NOTES, DEMOLITION PLAN AND SCHEDULE:** Replace this sheet in its entirety with the attached sheet P001 dated August 18, 2017.

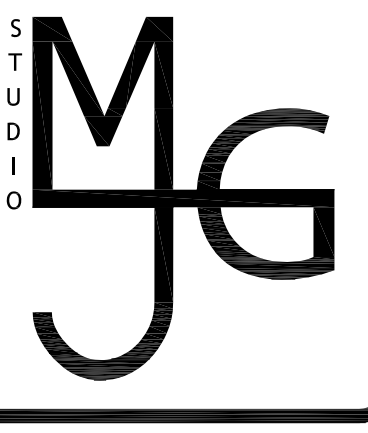


5206 SW 91st Terrace, Suite A
Gainesville, FL 32608
352.226.8061
www.studiomjg.com

- F1-7. DRAWINGS: Sheet P101– PLUMBING FLOOR PLANS AND RISER:** Replace this sheet in its entirety with the attached sheet P101 dated August 18, 2017.
- F1-8. DRAWINGS: Sheet E001– ELECTRICAL ABBREVIATIONS, LEGENDS AND NOTES:** Replace this sheet in its entirety with the attached sheet E001 dated August 18, 2017.
- F1-9. DRAWINGS: Sheet E101– ELECTRICAL DEMOLITION FLOOR PLAN, NOTES AND ONE-LINE DIAGRAM:** Replace this sheet in its entirety with the attached sheet E101 dated August 18, 2017.
- F1-10. DRAWINGS: Sheet E201– ELECTRICAL POWER FLOOR PLAN, SPECS AND RISERS:** Replace this sheet in its entirety with the attached sheet E201 dated August 18, 2017.
- F1-11. DRAWINGS: Sheet E202– ELECTRICAL LIGHTING FLOOR PLAN AND FIXTURE SCHEDULE:** Replace this sheet in its entirety with the attached sheet E202 dated August 18, 2017.
- F1-12. DRAWINGS: Sheet E301– ELECTRICAL PANEL SCHEDULES AND LOAD CALCULATIONS:** Replace this sheet in its entirety with the attached sheet E301 dated August 18, 2017
- F1-13. DRAWINGS: Sheet T101– TELECOMM FLOOR PLAN, LEGEND AND RISER:**
Replace this sheet in its entirety with the attached sheet T101 dated August 18, 2017

Sincerely,

Michael J. Gilfilen,
President
Studio MJG, llc



STUDIO MJG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - PHASE 1
RENOVATION**

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

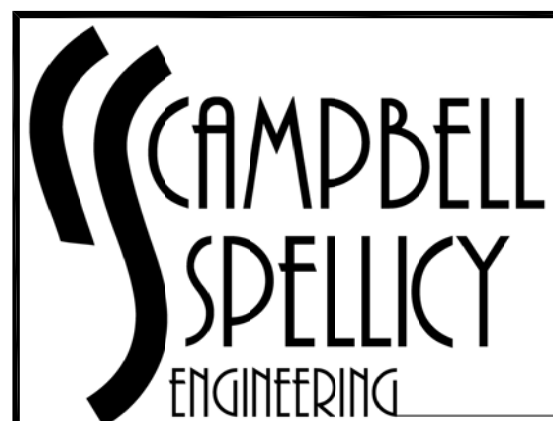
KEVIN M. SPELLICY
PE - 76968

No.	DESCRIPTION	DATE
△	FIELD ORDER NO.1	8/18/2017

PROJECT NUMBER:	17032
ISSUE DATE:	18 AUGUST 2017
CREATED BY:	AEF
CHECKED BY:	KMS

M001

MECHANICAL
LEGEND, NOTES
DETAILS &
SCHEDULES



PROJECT: 17032

3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

FIELD ORDER NO.1

**VARIABLE REFRIGERANT FLOW SYSTEM
OUTDOOR CONDENSING UNIT SCHEDULE**

UNIT DESIGNATION	CU-1	
LOCATION	GROUND	
MANUFACTURER	MITSUBISHI	
MODEL NUMBER	PUHY-P216TSLMU-A-BS	
UNIT TYPE	VRF HEAT PUMP	
NOMINAL COOLING CAPACITY (BTU/H)	216,000	
COOLING EFFICIENCY (EER/IEER)	13.3/24.5	
NOMINAL HEATING CAPACITY (BTU/H)	243,000	
HEATING FULL LOAD EFFICIENCY (COP)	3.64	
MODULAR UNIT DESIGNATION	CU-1A ①	CU-1B ①
MODULAR UNIT MODEL NUMBER	PUHY-P120TSLMU	PUHY-P96TSLMU
ELECTRICAL CHARACTERISTICS (V-Φ)	208-3	208-3
COMPRESSOR TYPE	INVERTER SCROLL	INVERTER SCROLL
MINIMUM CIRCUIT AMPACITY (A)	42 ①	32 ①
MAXIMUM OVERCURRENT PROTECTION (A)	60 ①	50 ①
REFRIGERANT PIPE SIZE HIGH - LOW (IN. - IN.)	5/8 - 1-1/8 ④	
REFRIGERANT CHARGE (LBS)	69.2	
SOUND LEVEL (dB)	62.5	62.5

- ① CU-1 IS A MODULAR UNIT THAT CONSISTS OF ONE 72,000 BTU/H CONDENSING UNIT (CU-1A) AND 120,000 BTU/H CONDENSING UNIT (CU-1B) TWINNED TOGETHER. DISCONNECT SHALL BE PROVIDED FOR EACH CONDENSING UNIT BY DIVISION 16.
 ② PROVIDE FACTORY START-UP WITH UNIT.
 ③ SYSTEM SHALL MAINTAIN 100% LOW AMBIENT COOLING CAPACITY DOWN TO 23°F.
 ④ COMBINED PIPE SIZE FOR TOTAL UNIT. SEE MANUFACTURER'S RECOMMENDATIONS FOR INDIVIDUAL UNIT PIPE SIZING.
 ⑤ ELECTRICAL DISCONNECTS SHALL BE PROVIDED BY DIVISION 16.

VARIABLE REFRIGERANT FLOW SYSTEM INDOOR AC UNIT SCHEDULE

UNIT DESIGNATION	AC-1-1 ⑦	AC-1-2 ⑦	AC-1-3 ⑦	AC-1-4 ⑦	AC-1-5 ⑦	AC-1-6 ⑦
LOCATION	BREAKOUT/OFFICE	OPEN OFFICE	MECHANICAL	WORKROOM	CONFERENCE	WAITING
MANUFACTURER	MITSUBISHI					
MODEL NUMBER	PEFY-P12NMAU-E	PEFY-P30NMAU-E3	PKFY-P06NBMU	PEFY-P27NMAU-E3	PEFY-P15NMAU-E	PEFY-P24NMAU-E
UNIT TYPE	CONCEALED DUCTED MEDIUM STATIC	CONCEALED DUCTED MEDIUM STATIC	WALL MOUNTED UNIT	CONCEALED DUCTED MEDIUM STATIC	CONCEALED DUCTED MEDIUM STATIC	CONCEALED DUCTED MEDIUM STATIC
NOMINAL COOLING CAPACITY (BTU/H)	12,000	30,000	6,000	27,000	15,000	24,000
ADJUSTED TOTAL COOLING CAPACITY (BTU/H) ①④	9,849	24,271	4,863	21,225	11,833	18,805
ADJUSTED SENSIBLE COOLING CAPACITY (BTU/H) ①④	7,735	19,892	3,923	18,600	10,415	17,598
NOMINAL HEATING CAPACITY (BTU/H)	13,500	34,000	6,700	30,000	17,000	27,000
ADJUSTED HEATING CAPACITY (BTU/H) ①④	8,828	22,157	4,369	19,356	10,982	17,401
EXTERNAL STATIC PRESSURE (IN. WG)	0.6	0.6	N/A	0.6	0.6	0.6
TOTAL SUPPLY AIR (CFM)	315	880	410	615	350	615
OUTSIDE AIR (CFM) ②	30	100	10	75	65	40
ELECTRICAL CHARACTERISTICS (V-Φ)	208-1	208-1	208-1	208-1	208-1	208-1
UNIT MCA/MOCP ⑩	1.20/15	2.73/15	0.19/15	2.73/15	1.45/15	2.73/15
REFRIGERANT PIPE SIZE LIQUID - GAS (IN. - IN.) ⑦	1/4 - 1/2	3/8 - 5/8	1/4 - 1/2	3/8 - 5/8	1/4 - 1/2	3/8 - 5/8
SOUND LEVEL (dB)	32	34	28	30	28	34
WEIGHT (LBS)	41	67	49	67	58	67

- ① CAPACITY ADJUSTED FOR ACTUAL DESIGN CONDITIONS AND PIPING LOSSES.
 ② TEMPERED OUTSIDE AIR DELIVERED FROM ERV-1. SEE SCHEDULE FOR DETAILS.
 ③ PROVIDE FACTORY STARTUP FOR ENTIRE SYSTEM.
 ④ ALL CAPACITIES ARE MINIMUMS, BASED ON ACTUAL PIPE ROUTING AND RUN LENGTHS.
 ⑤ PROVIDE DRAIN PAN FLOAT SENSORS ON ALL UNITS FOR UNIT SHUTDOWN.
 ⑥ PROVIDE WALL MOUNTED, BACKLIT THERMOSTAT WITH EACH INDOOR UNIT.
 ⑦ PROVIDE REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ISOLATION BALL VALVES WITH INTEGRAL SHADDER FITTINGS AT EACH AC UNIT.
 ⑧ PROVIDE FACTORY-MATCHED CONDENSATE PUMP FOR EACH AC UNIT.
 ⑨ INSTALLING CONTRACTOR MUST BE MITSUBISHI CERTIFIED FOR INSTALLING VRF SYSTEMS.
 ⑩ WARRANTY: 10 YEAR PARTS ON ENTIRE UNIT & COMPRESSOR
 ⑪ PROVIDE MANUFACTURER'S DISCONNECT (WITH MOCP) FOR ALL INDOOR UNITS.

ENERGY RECOVERY VENTILATOR SCHEDULE

MARK	AIR QUANTITY OA/EXH (CFM)	STATIC PRESSURE (IN. H2O)	OA WINTER DB/RH	OA SUMMER EAT DB/RH	EXH WINTER EAT DB/RH	EXH SUMMER EAT DB/RH	OA WINTER LAT DB/WB	OA SUMMER LAT DB/WB	ELEC. CHAR. (V-Φ)	MANUFACTURER	MODEL NUMBER	SOUND LEVEL (dB)	MCA/MOPD (AMPS)	REMARKS
ERV-1	450	0.6	20/30	95/57	70/40	75/50	56.3/43.8	80.5/73.8	208-1	MITSUBISHI	LGH-F470	33	3.1/15	①②③④

- ① PROVIDE ELECTRICAL DISCONNECT (WITH MOCP) WITH UNIT
 ② PROVIDE UNIT WITH 1" WASHABLE FILTERS
 ③ PROVIDE FACTORY STARTUP OF UNIT.
 ④ FACTORY WARRANTY: 10 YEAR PARTS ON CORE & 5 YEAR PARTS ENTIRE UNIT, 1ST YEAR LABOR (ENTIRE UNIT).

MECHANICAL ABBREVIATIONS

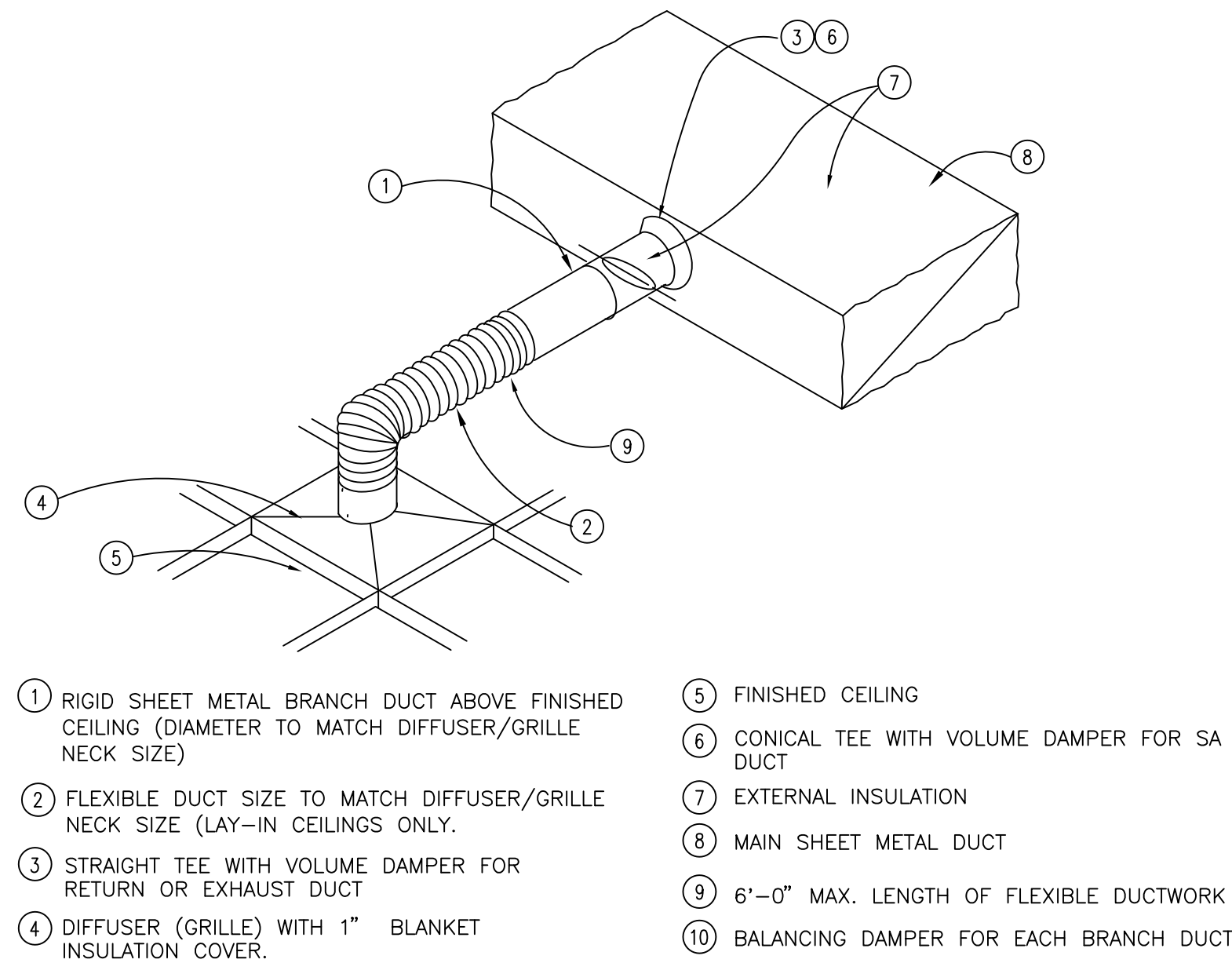
AAV AMP'S AREA
 ABV CLG ABOVE FINISHED CEILING
 ACU AIR CONDITIONING UNIT
 AFF ABOVE FINISHED FLOOR
 AHU AIR HANDLING UNIT
 AP ACCESS PANEL
 BD BALANCING DAMPER
 BTU BRITISH THERMAL UNITS
 BTU/H BTU PER HOUR
 CD CONDENSATE
 CFM CUBIC FEET PER MINUTE
 CFM CUBIC FEET PER MINUTE
 DB DRY BULB
 DEFL DEFLECTION
 DG DOOR GRILLE
 DIA DIAMETER
 EA EACH
 EAT ENTERING AIR TEMPERATURE
 ENT ENTERING
 ESP EXTERNAL STATIC PRESSURE
 EXH EXHAUST
 EXST EXISTING
 °F DEGREES FAHRENHEIT
 FD FIRE DAMPER
 FL_DR FLOOR DRAIN
 FPM FEET PER MINUTE
 FT FEET
 FT_GAUGE FEET OF WATER, GAUGE
 GALV GALVANIZED
 HP HORSEPOWER
 HR HOUR
 I.D. INSIDE DIAMETER
 IN. INCHES
 IN_WG INCHES OF WATER, GAUGE
 KW KILOWATTS
 LAT LEAVING AIR TEMPERATURE
 LB POUND
 LVC LEAVING
 MAX MAXIMUM
 MBH THOUSANDS OF BTU'S
 MIN MINUTE
 MIN MINIMUM
 NIC NORMALLY CLOSED
 NIC NOT IN CONTRACT
 NIC NORMALLY OPEN
 N.O. NUMBER
 NTS NOT TO SCALE
 OA OUTDOOR AIR
 OA_LOUVER OUTDOOR AIR LOUVER
 OC ON CENTER
 O.D. OUTSIDE DIAMETER
 PSI POUNDS PER SQUARE INCH
 PRESS PRESSURE
 R RADIUS
 RA RETURN AIR
 RAG RETURN AIR GRILLE
 RAR RETURN AIR REGISTER
 RD ROUND DIFFUSER
 RH RELATIVE HUMIDITY
 RL REFRIGERANT LIQUID
 RLS REFRIGERANT LIQUID SUCTION
 RPM REVOLUTIONS PER MINUTE
 RS REFRIGERANT SUCTION
 SA SUPPLY AIR
 SAR SUPPLY AIR REGISTER
 SF SUPPLY FAN
 SP STATIC PRESSURE
 SPEC SPECIFICATION
 SF SQUARE FEET
 SPEC SPECIFICATION
 STD STANDARD
 STL STEEL
 TEMP TEMPERATURE
 TO TRANSFER DUCT
 TG TRANSFER GRILLE
 TSP TOTAL STATIC PRESSURE
 TYP TYPICAL
 UC UNDERCUT DOOR - 3/4"
 V VOLTS
 WB WET BULB
 WPD WATER PRESSURE DROP

MECHANICAL GENERAL NOTES

- DUCT SIZES ARE CLEAR INSIDE SHEET METAL SIZES. DUCT SIZES AND LOCATIONS ARE APPROXIMATE. AFTER THE START OF CONSTRUCTION THE CONTRACTOR SHALL OBTAIN TRUSS SHOP DRAWINGS AND SHALL RELOCATE AND RESIZE DUCT AS REQUIRED TO FIT BELOW THE TRUSSES AND MAINTAINING THE SAME DUCT FREE AREA. PRIOR TO FABRICATING DUCTWORK THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR THE REVISED LAYOUT. SEE NOTE 4.
- VERIFY COLLAR SIZES ON ALL AIR TERMINALS, EQUIPMENT INLETS AND OUTLETS. TRANSITION DUCTWORK AS NECESSARY. EXTERNALLY INSULATE TRANSITIONS AT EQUIPMENT CONNECTIONS.
- SEE ARCHITECTURAL CEILING PLANS FOR EXACT LOCATION OF ALL CEILING OUTLETS.
- CONTRACTOR SHALL VERIFY CLEARANCE SPACE AVAILABLE, OFFSETS REQUIRED, STRUCTURAL OPENINGS, AND WORK BY OTHER TRADES PRIOR TO FABRICATION OF DUCTWORK. SUBMIT SHOP DRAWINGS ON DUCTWORK LAYOUT. COORDINATE WITH ROOF TRUSSES/STRUCTURE. PRESSURE TEST ALL DUCTWORK FOR LEAKS. SEE SPECIFICATIONS. RETURN DUCT SHALL BE TESTED UNDER NEGATIVE PRESSURE.
- PROVIDE DUCT FLEX CONNECTIONS AT NEW UNITS. EXTERNALLY INSULATE FLEXIBLE CONNECTIONS.
- PROVIDE CLEAN PLEATED FILTERS PRIOR TO TEST AND BALANCE WORK. PROVIDE NEW PLEATED FILTERS AS REQUIRED PRIOR TO FINAL ACCEPTANCE BY OWNER. PROVIDE OWNER WITH ONE COMPLETE SET OF FILTERS FOR EACH A/C UNIT FOR OWNERS USE AT SUBSTANTIAL COMPLETION.
- PROVIDE 2" EXTERNAL INSULATION FOR ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK. EXHAUST DUCTWORK SHALL BE UNINSULATED.

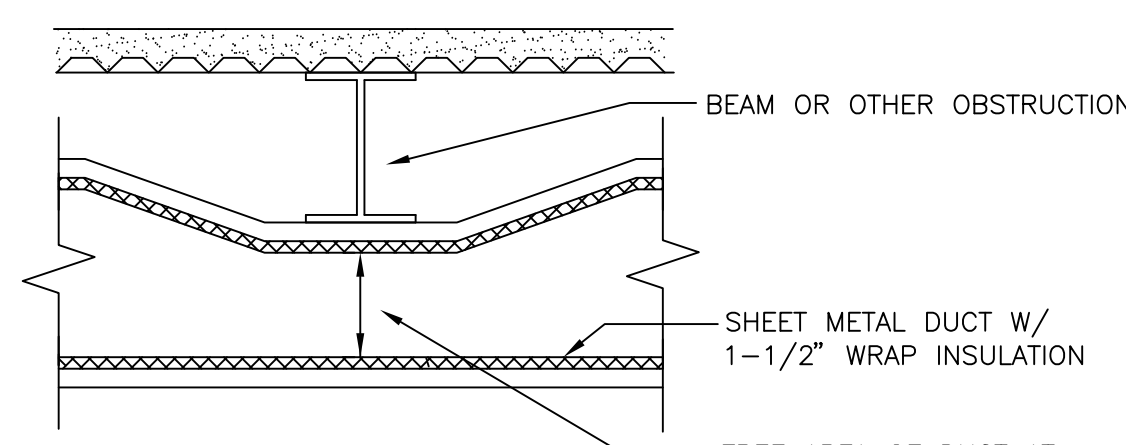
EQUIPMENT NOTES

- PROVIDE FULL SIZE PVC CONDENSATE DRAINS FROM ALL UNITS TO DISPOSAL POINT INDICATED ON THE DRAWINGS.
- PROVIDE A TRAP ON ALL CONDENSATE DRAIN OUTLETS. SLOPE ALL CONDENSATE DRAIN PIPING MINIMUM 1/4" INCH PER FOOT.
- CONTRACTOR SHALL INSTALL ALL EQUIPMENT, PIPING AND DUCTWORK SUCH THAT MANUFACTURER'S RECOMMENDED CLEARANCES ARE MET FOR ALL ACCESS PANELS, MOTORS, FANS, BELTS, FILTERS, AIR INTAKES, ETC.
- FLOOR-MOUNTED AHUs SHALL BE INSTALLED ON BASE RAILS AS INDICATED. PROVIDE NEOPRENE PADS BETWEEN RAIL AND CONCRETE.
- PROVIDE ACCESS PANELS IN ALL NON-ACCESSIBLE CONSTRUCTIONS (INCLUDING CEILING, WALLS, ETC) SIZED AND LOCATED AS REQUIRED TO PROVIDE PROPER SERVICE ACCESS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION FOR ALL HVAC EQUIPMENT INCLUDING DAMPERS AND VALVES.



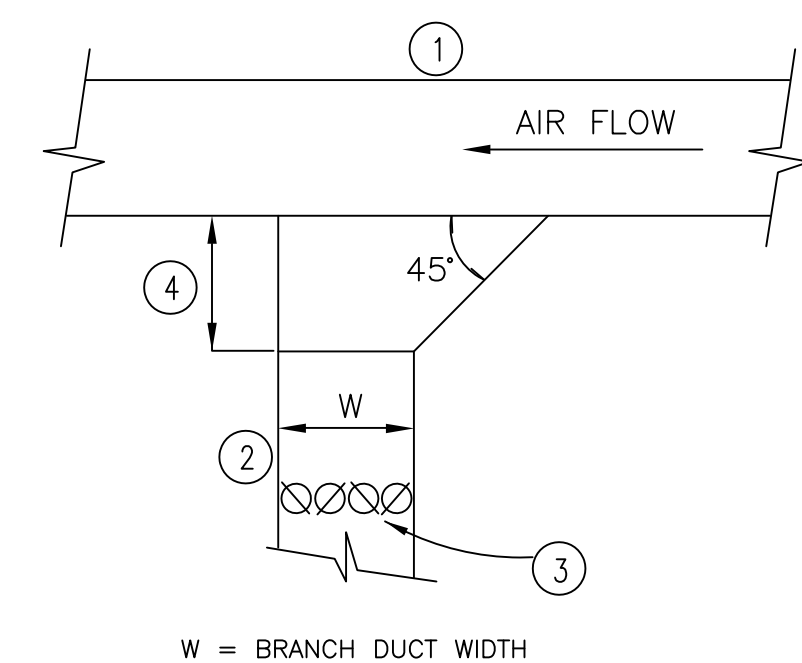
DUCT RUNOUT TO DIFFUSER (GRILLE) DETAIL- TYPICAL

NOT TO SCALE



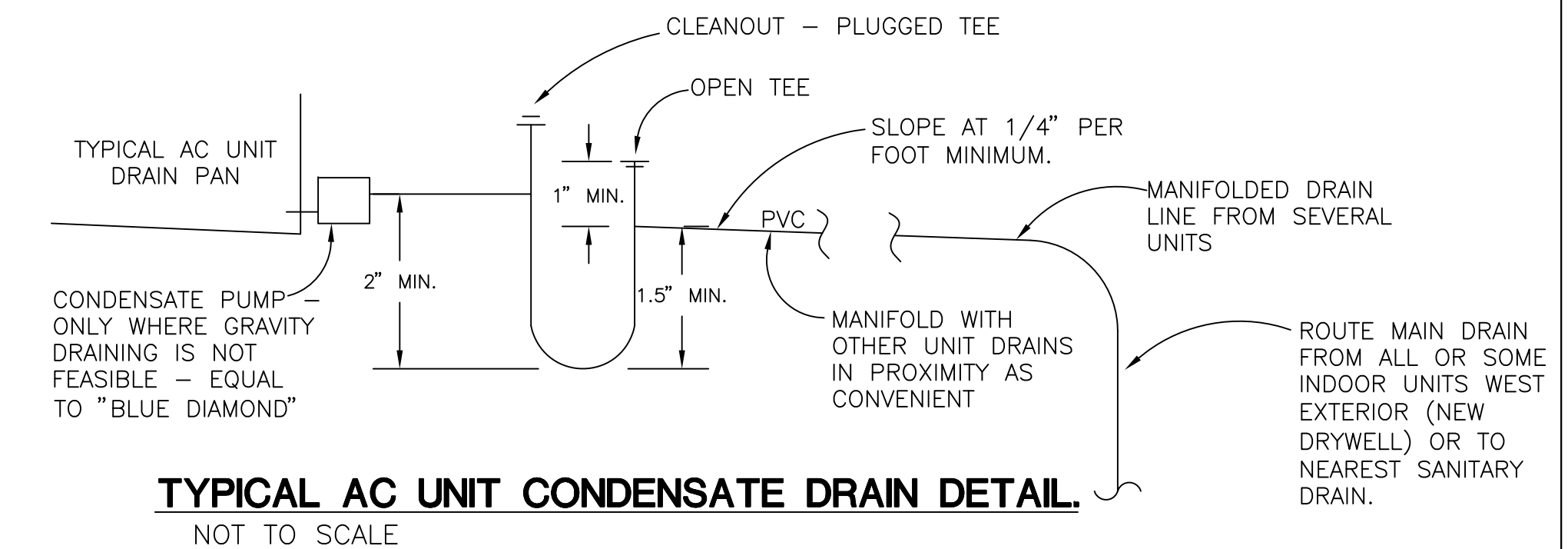
DUCT EASEMENT DETAIL

NOT TO SCALE



BRANCH DUCT TAKEOFF DETAIL - TYPICAL

NOT TO SCALE

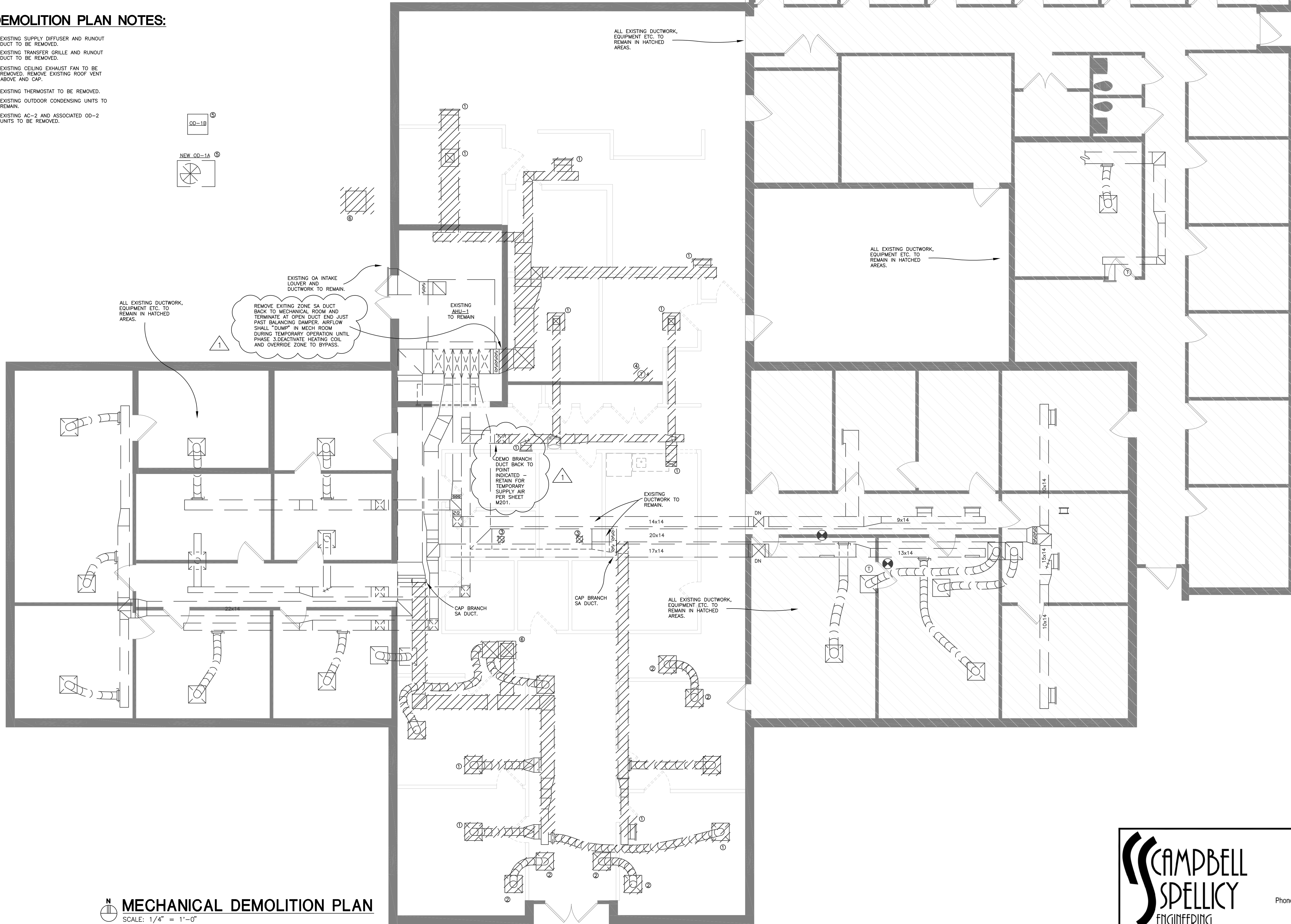
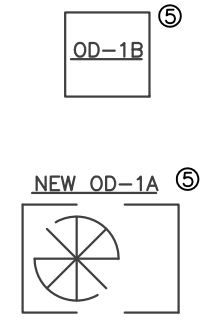


TYPICAL AC UNIT CONDENSATE DRAIN DETAIL.

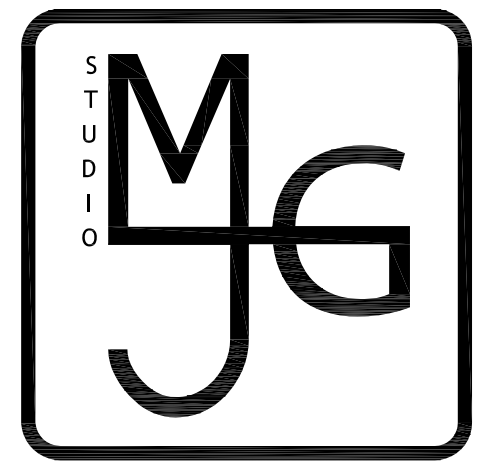
NOT TO SCALE

DEMOLITION PLAN NOTES:

- ① EXISTING SUPPLY DIFFUSER AND RUNOUT DUCT TO BE REMOVED.
- ② EXISTING TRANSFER GRILLE AND RUNOUT DUCT TO BE REMOVED.
- ③ EXISTING CEILING EXHAUST FAN TO BE REMOVED. REMOVE EXISTING ROOF VENT ABOVE AND CAP.
- ④ EXISTING THERMOSTAT TO BE REMOVED.
- ⑤ EXISTING OUTDOOR CONDENSING UNITS TO REMAIN.
- ⑥ EXISTING AC-2 AND ASSOCIATED OD-2 UNITS TO BE REMOVED.



MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"



STUDIO M J G, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - PHASE 1
RENOVATION**
University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

KEVIN M. SPELLICY
PE - 76968

No.	DESCRIPTION	DATE
1	FIELD ORDER NO. 1	8/18/2017

PROJECT NUMBER: 17032
ISSUE DATE: 18 AUGUST 2017
CREATED BY:
CHECKED BY: KMS

M101
MECHANICAL
DEMOLITION
FLOOR PLAN

**CAMPBELL
SPELLICY
ENGINEERING**

3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

PROJECT: 17032 FIELD ORDER NO.1



STUDIO MUG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMUG.COM

MPO2649 BUILDING 700 - PHASE 1 RENOVATION

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

KEVIN M. SPELLICY
PE - 76968

No. DESCRIPTION DATE
FIELD ORDER NO. 1 8/18/2017

PROJECT NUMBER: 17032
ISSUE DATE: 18 AUGUST 2017
CREATED BY: AEF
CHECKED BY: KMS

M201
MECHANICAL
FLOOR PLAN

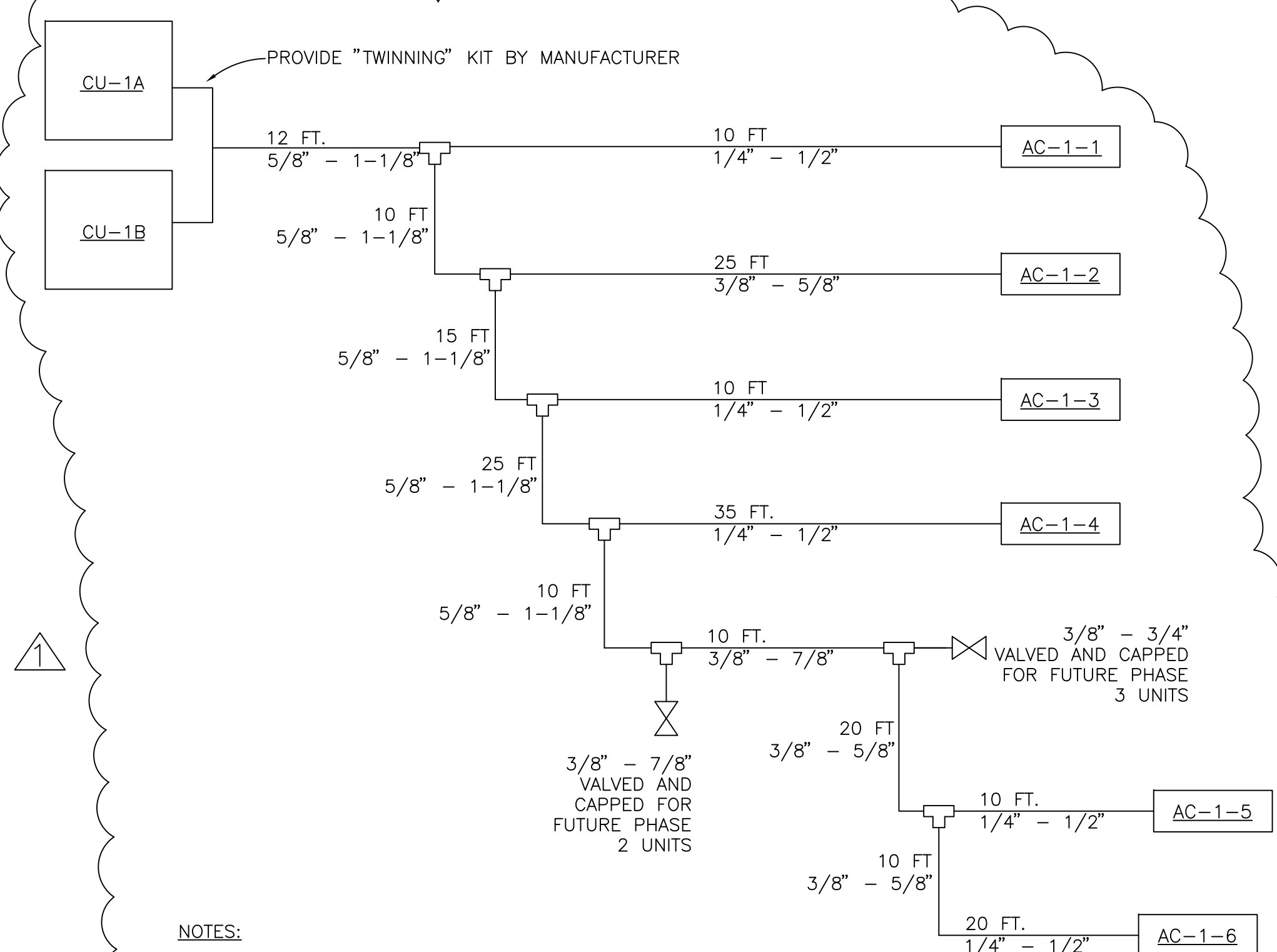
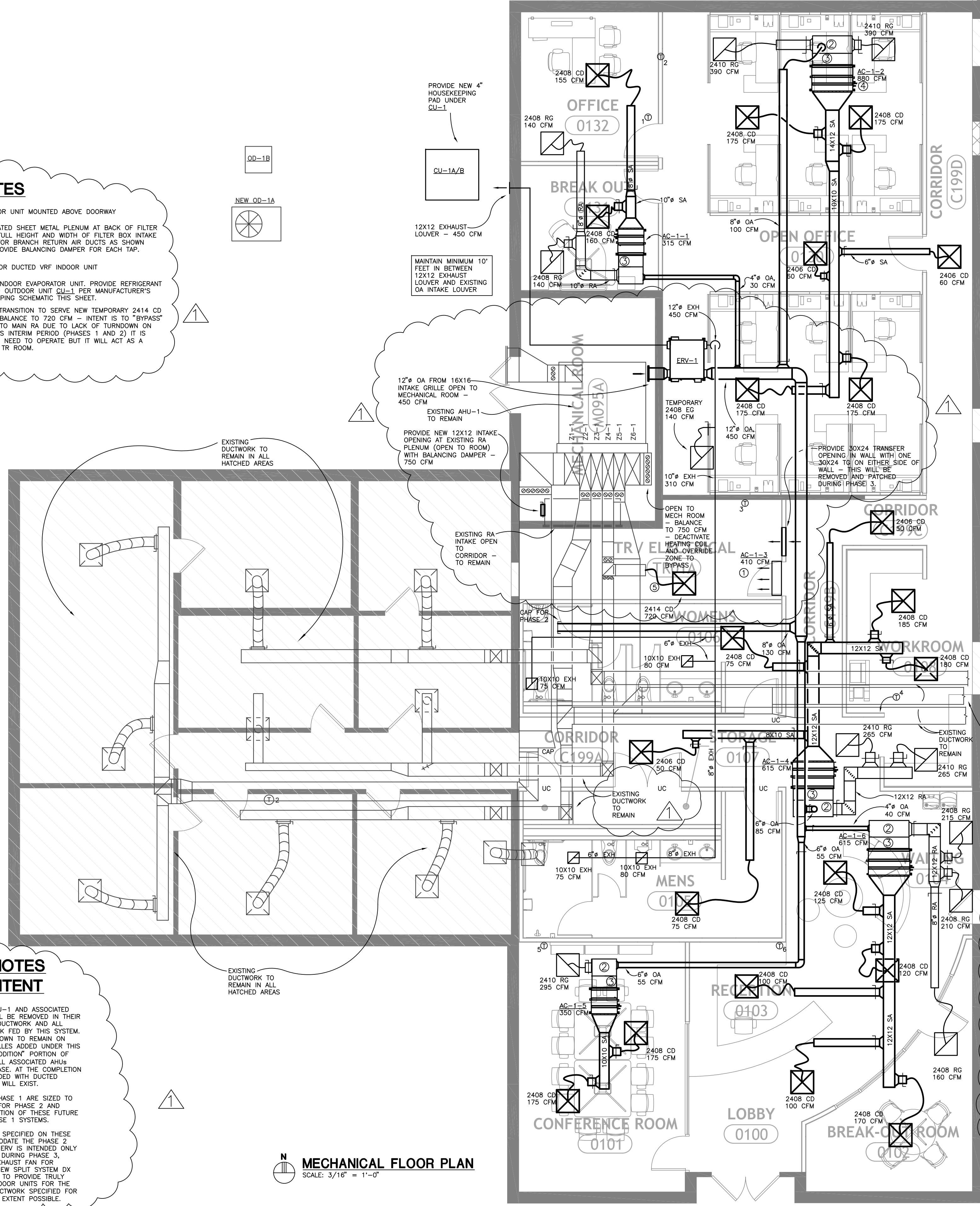
SHEET NOTES

- WALL MOUNTED VRF INDOOR UNIT MOUNTED ABOVE DOORWAY
- PROVIDE 18" DEEP INSULATED SHEET METAL PLENUM AT BACK OF FILTER BOX. PLENUM SHALL BE FULL HEIGHT AND WIDTH OF FILTER BOX INTAKE OPENING. PROVIDE TAPS FOR BRANCH RETURN AIR DUCTS AS SHOWN INTO TOP OF PLENUM. PROVIDE BALANCING DAMPER FOR EACH TAP.
- FILTER BOX ACCESSORY FOR DUCTED VRF INDOOR UNIT
- CONCEALED DUCTED VRF INDOOR EVAPORATOR UNIT. PROVIDE REFRIGERANT PIPING FOR EACH UNIT TO OUTDOOR UNIT CU-1 PER MANUFACTURER'S RECOMMENDATIONS AND PIPING SCHEMATIC THIS SHEET.
- PROVIDE 14X14 TO 14" TRANSITION TO SERVE NEW TEMPORARY 2414 CD IN TR/ELECTRICAL ROOM. BALANCE TO 720 CFM - INTENT IS TO "BYPASS" THIS SUPPLY AIR BACK INTO MAIN RA DUE TO LACK OF TURNDOWN ON EXISTING AHU. DURING THIS INTERIM PERIOD (PHASES 1 AND 2) IT IS UNLIKELY THAT AC-4 WILL NEED TO OPERATE BUT IT WILL ACT AS A BACKUP TO PROTECT THE TR ROOM.

MASTER PLAN NOTES HVAC DESIGN INTENT

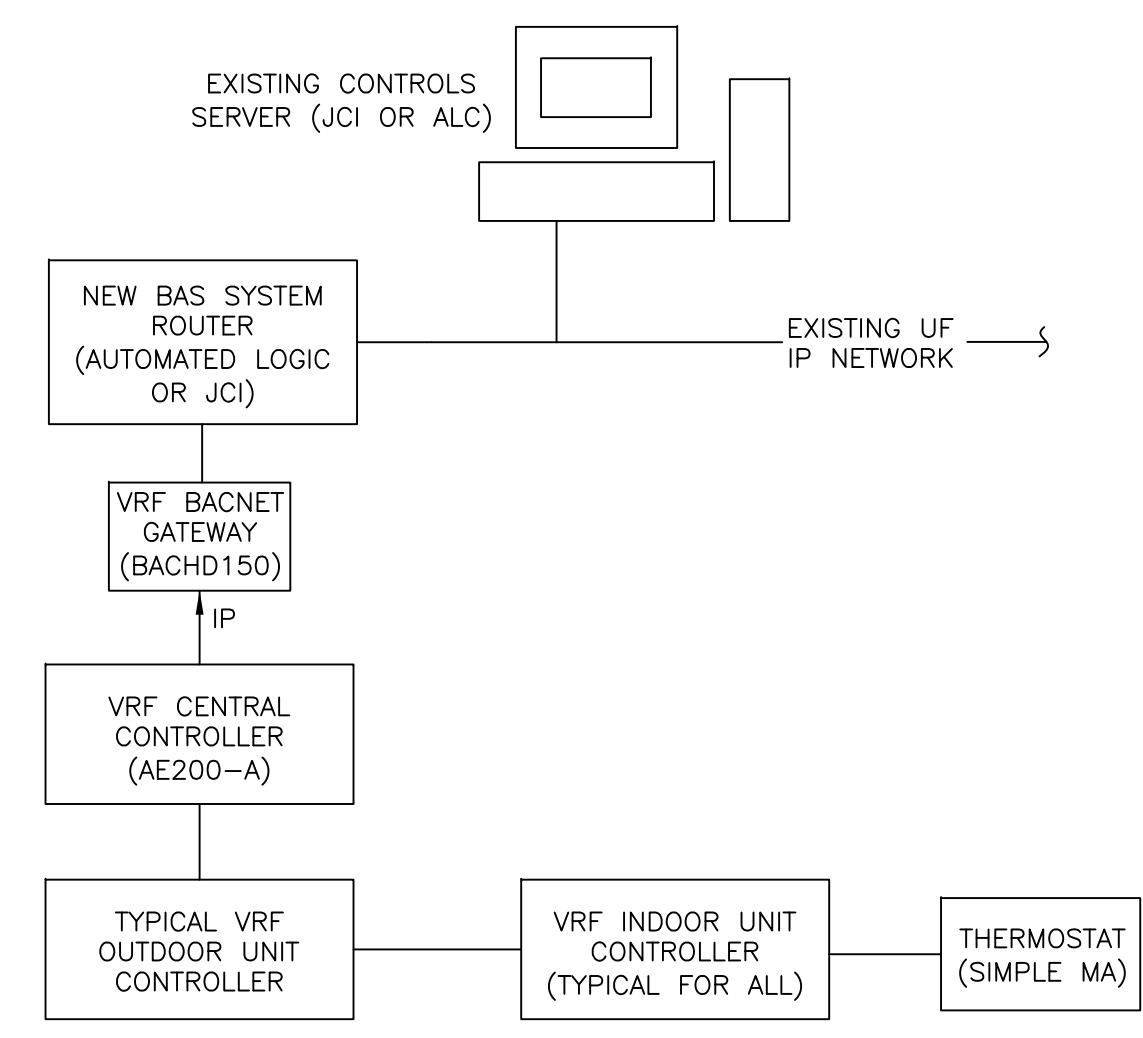
- UNDER FUTURE PHASE 3, THE EXISTING AHU-1 AND ASSOCIATED CONDENSING UNITS OD-1A AND OD-1B WILL BE REMOVED IN THEIR ENTIRETY INCLUDING THE REMAINING ZONE DUCTWORK AND ALL RETURN AIR DUCTWORK/TRANSFER DUCTWORK FED BY THIS SYSTEM. THIS INCLUDES ALL EXISTING DUCTWORK SHOWN TO REMAIN ON THIS PLAN AND TEMPORARY DUCTWORK/GRILLES ADDED UNDER THIS PHASE. THE EXISTING DUCTWORK IN THE "ADDITION" PORTION OF THE BUILDING (NORTHEAST CORNER) AND ALL ASSOCIATED AHUs AND CUs BE REMOVED UNDER A LATER PHASE. AT THE COMPLETION OF ALL PHASES, ALL AREAS WILL BE PROVIDED WITH DUCTED RETURN AIR AND NO RETURN AIR PLENUMS WILL EXIST.
- THE VRF SYSTEM (CU-1) SPECIFIED FOR PHASE 1 ARE SIZED TO ACCOMMODATE FUTURE INDOOR VRF UNITS FOR PHASE 2 AND PHASE 3. PIPING IS PROVIDED FOR CONNECTION OF THESE FUTURE UNITS WITH MINIMAL DOWNTIME TO THE PHASE 1 SYSTEMS.
- THE ENERGY RECOVERY VENTILATOR, ERV-1 SPECIFIED ON THESE PHASE 1 DOCUMENTS IS SIZED TO ACCOMMODATE THE PHASE 2 OUTSIDE AIR REQUIREMENTS AS WELL. THIS ERV IS INTENDED ONLY TO BE USED TEMPORARILY UNTIL PHASE 3. DURING PHASE 3, ERV-1 WILL BE REPLACED BY AN INLINE EXHAUST FAN FOR EXHAUSTING THE PHASE 1 RESTROOMS. A NEW SPLIT SYSTEM DX 100% OUTSIDE AIR UNIT WILL BE INSTALLED TO PROVIDE TRULY PRECONDITIONED FRESH AIR TO ALL VRF INDOOR UNITS FOR THE ENTIRE BUILDING (ALL PHASES). THE OA DUCTWORK SPECIFIED FOR PHASES 1 AND 2 WILL BE REUSED TO THE EXTENT POSSIBLE.

MECHANICAL FLOOR PLAN
SCALE: 3/16" = 1'-0"



NOTES:
1. SIZES AND RUN LENGTHS SHOWN ABOVE ARE INTENDED FOR DESIGN ONLY (NOT FOR BIDDING PURPOSES) AND ARE SPECIFIC TO THE DESIGN BASIS UNITS. COORDINATE ACTUAL SIZES AND RUN LENGTHS WITH MANUFACTURER'S REQUIREMENTS.

VARIABLE REFRIGERANT FLOW REFRIGERANT PIPING DIAGRAM NOT TO SCALE

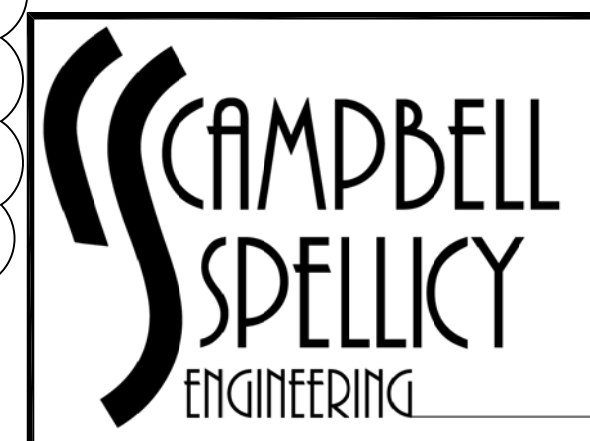


VARIABLE REFRIGERANT FLOW REFRIGERANT CONTROLS DIAGRAM NOT TO SCALE

DDC POINTS LIST SCHEDULE

	INPUT/OUTPUTS	FEATURES
ZONE TEMPERATURE		
SUPPLY AIR TEMPERATURE		
SPACE HEATING SETPOINT		
SPACE COOLING SETPOINT		
FAN SPEED (HIGH/MED/LOW)		
RUN STATUS (ON/OFF)		
UNIT MODE (COOL/HEAT/DEHUM ETC.)		
COMPRESSOR STATUS (% CAPACITY)		
DRAIN PAN FLOAT SWITCH ALARM		
DRAIN PAN FLOAT SWITCH SHUTDOWN (-)		
TIME SCHEDULE		
BAS INTEGRATION		
TYPICAL VRF INDOOR UNIT	●●●●●●●●	●●●●●●●●
TYPICAL VRF OUTDOOR UNIT	●●●●●●●●	●●●●●●●●
ERV-1	●●●●●●●●	●●●●●●●●

1. FLOAT SWITCH SHUTDOWN FOR INDOOR UNIT SHALL SHUTDOWN ONLY THE UNIT IN ALARM AND NO OTHERS.



3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 0008813

PROJECT: 17032

FIELD ORDER NO.1

PLUMBING LEGEND

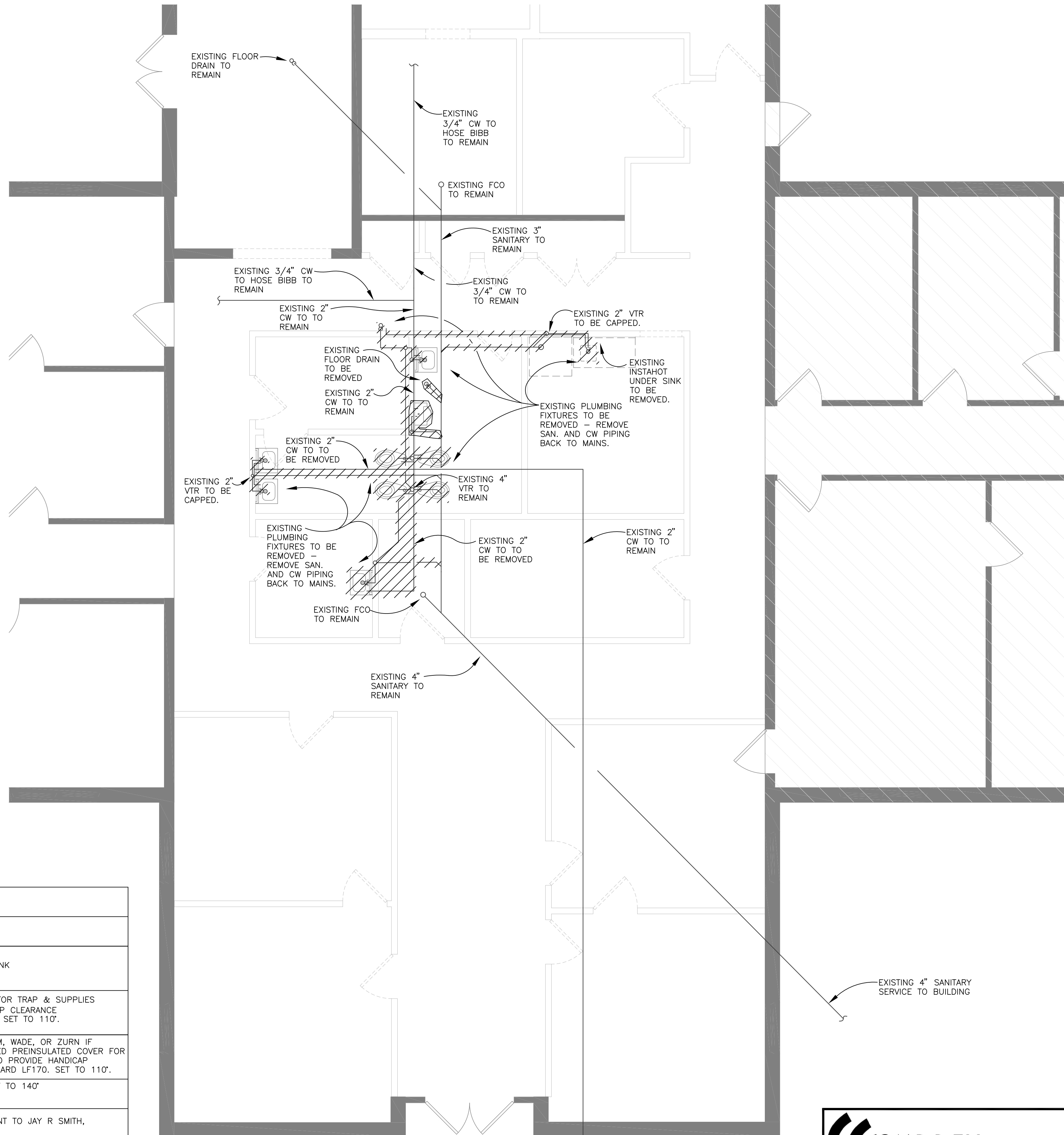
---	CW	COLD WATER SUPPLY PIPING (COPPER)
---	V	VENT PIPING (PVC)
---	S	SOIL PIPING (PVC)
⊕		WATER HAMMER ARRESTOR
⊕	BV	BALL VALVE
---		UNION
---		CAPPED PIPING
---	CO	CLEANOUT
---	CTG	CLEANOUT TO GRADE
---	FCO	FLOOR CLEANOUT
---	WCO	WALL CLEANOUT
---		P-TRAP
---	HB	HOSE BIBB
HB	HOSE BIBB	WHA WATER HAMMER ARRESTOR
CW	COLD WATER	CTG CLEANOUT UP TO GRADE
HW	HOT WATER	FCO FLOOR CLEANOUT
VTR	VENT THRU ROOF	WCO WALL CLEANOUT
DN	DOWN	D DRAIN
AP	ACCESS PANEL	(F.U.) FIXTURE UNIT COUNT
BVIYB	BALL VALVE IN YARD BOX	CONNECTION SYMBOL - VERIFY SITE WORK - PROVIDE MATERIALS AND LABOR TO COMPLETE CONNECTIONS

PLUMBING GENERAL NOTES

- COORDINATE ALL PIPING WITH DUCTWORK SHOP DRAWINGS. ROUTE PIPING AS REQUIRED TO MISS DUCTS.
- COORDINATE ALL BUILDING PLUMBING PIPING WITH SITE PIPING SYSTEMS PRIOR TO START OF ANY WORK.
- FIELD VERIFY INVERTS PRIOR TO LAYING OUT SANITARY PIPING. ALL PIPING INDICATED ON THE PLUMBING DRAWINGS IS ABOVE THE CEILING EXCEPT THE OBVIOUS SOIL AND WASTE PIPING BELOW THE FLOOR.
- ALL VENTS-THRU-ROOF SHALL BE MINIMUM 10'-0" CLEAR FROM HVAC OUTSIDE AIR INTAKES.
- VERIFY ALL ELEVATIONS NOTED ON ARCHITECTURAL DRAWINGS WITH ACTUAL ELEVATIONS FOUND ON THE SITE AND WITH ELEVATIONS NOTED ON ARCHITECTURAL DRAWINGS PRIOR TO INSTALLING NEW WORK. FAILURE TO RESOLVE COORDINATION PROBLEMS PRIOR TO INSTALLING NEW WORK SHALL NOT BE CAUSE FOR ADDITIONAL COSTS. ENGINEER WILL RESOLVE ANY APPARENT DISCREPANCIES. ALL PIPING PASSING THROUGH MASONRY WALLS SHALL HAVE A SLEEVE - (SEE SPECIFICATIONS).
- PROVIDE PIPE SLEEVES PER SPECIFICATIONS (AND IN ACCORDANCE WITH THE STANDARD PLUMBING CODE SECTION ON PIPING THROUGH FOUNDATION WALLS AND UNDER FOOTINGS) AT ALL LOCATIONS WHERE SANITARY DRAIN PIPING PASS THROUGH FOUNDATION WALLS BELOW FLOOR SLABS (STEM WALLS). REFER TO STANDARD PLUMBING CODE AND FOOTING DRAWINGS. PROVIDE PIPE SLEEVE AND CONCRETE RELIEVING ARCH AT ALL LOCATIONS WHERE SANITARY PIPES PASS UNDER FOOTINGS. REFER TO FLORIDA PLUMBING CODE AND FOOTING DRAWINGS. COORDINATE ALL BELOW GRADE PIPING WITH FOUNDATION DRAWINGS TO ENSURE PROPER DROPPED FOOTINGS, RELIEVING ARCHES AND/OR SLEEVES ARE INSTALLED.
- SUPPORT PIPING USING MANUFACTURED HANGERS AND SUPPORTS SUCH AS THOSE MANUFACTURED BY HUBBARD INDUSTRIES.
- SEAL WALL OR ROOF PENETRATIONS USING A METAL ROOF PIPE FLASHING. USE SOLAR SEAL SEALANT AND BUTYL TAPE TO SEAL AIR AND WATER TIGHT.
- DROP PIPING AS REQUIRED AT EXITS OF BUILDING WALL.
- ALL WALL CLEANOUTS SHALL BE EXTENDED WITH PIPING FLUSH WITH WALL. THIS WILL BE UNDERSTOOD THAT THE RIM OF THE SCREWED PORTION OF THE CLEANOUT ADAPTOR IS FLUSH WITH THE WALL. THIS ARRANGEMENT WILL REQUIRE A RECESSED HEAD PLUG. SET ALL WALL CLEANOUTS SO BOTTOM OF ADAPTOR IS A MINIMUM OF 6" ABOVE THE FINISHED FLOOR AND COVER IS ABOVE FLOOR CORNER TILE OR FLOOR BASE MOULDING. A WALL CLEANOUT IS REQUIRED IN EVERY VERTICAL STACK. FILL WALL CAVITY WITH CONCRETE BELOW ALL WALL CLEANOUTS THAT ARE SET BELOW FLOOD LEVEL RIMS OF FIXTURES, TO PREVENT DRIPPINGS FROM SETTLING IN WALL CAVITIES.
- PROVIDE CLEANOUTS AS FOLLOWS: (A) AT BASE OF EACH VERTICAL STACK INCLUDING BACKVENT (OR INDIVIDUAL VENTS). (B) AT EACH CHANGE OF DIRECTION OF HORIZONTAL RUN. (C) AT 50 FOOT INTERVALS OF HORIZONTAL RUNS.
- STOPS FOR THIS PROJECT SHALL HAVE CAST BRASS BODIES WITH METAL HANDLES AND STEMS.
- ALL SHUT OFF CONTROL VALVES, WATER HAMMER ARRESTOR'S, CLEANOUTS OR OTHER OPERABLE PLUMBING DEVICES SHALL BE ACCESSIBLE FROM AN EIGHT FOOT STEP LADDER ON THE STANDING RUNGS OF THE LADDER.

PLUMBING FIXTURE AND CONNECTION SCHEDULE

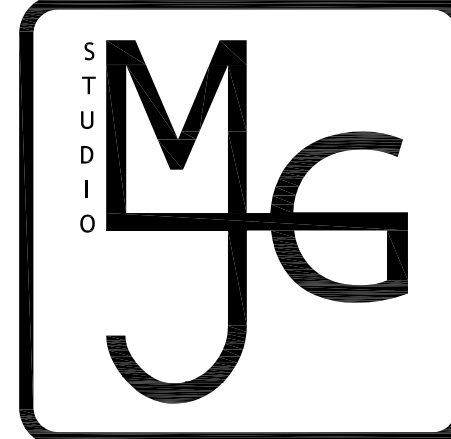
P-NO	FIXTURE DESCRIPTION	MOUNTING HEIGHT	MIN. CONNECTIONS			SPECIFICATION			NOTES
			WASTE	CW	HW	MANUFACTURER	FIXTURE	TRIM	
P-1	WATER CLOSET FLOOR MOUNTED FLUSH VALVE 1.28 GAL/FLUSH	FLOOR TO RIM 16 1/2"	4"	1/2"	---	AMERICAN STANDARD 2859.111	---	SEAT - SPERZEL 50-EWSSCH	
						SLOAN	ROYAL 111	PROVIDE FLUSH HANDLE ON LAV SIDE OF TANK	
P-2	ADA LAVATORY W/ VANITY 4" CENTER SET	FLOOR TO BTM OF APRON MIN. 29"	1 3/4"	1/2"	1/2"	BOWL W/ CABINET	---	PROVIDE PREMOLDED PREINSULATED COVER FOR TRAP & SUPPLIES	
						CHICAGO	2200-E28	PROVIDE DRAIN OFFSET TO PROVIDE HANDICAP CLEARANCE	
								PROVIDE TEMPERING VALVE. LEONARD LF170. SET TO 110°.	
P-3	ADA LAVATORY WALL HUNG 21"X18" 4" CENTER SET	FLOOR TO BOTTOM OF APRON MIN. 29"	1 1/4"	1/2"	1/2"	AMERICAN STANDARD 0355.012	---	PROVIDE FLOOR MOUNTED CARRIER BY JOSAM, WADE, OR ZURN IF MOUNTED ON STUD WALL. PROVIDE PREMOLDED PREINSULATED COVER FOR TRAP & SUPPLIES	
						---	---	PROVIDE DRAIN OFFSET TO PROVIDE HANDICAP CLEARANCE	
						CHICAGO	2200-E28	PROVIDE TEMPERING VALVE. LEONARD LF170. SET TO 110°.	
P-4	ELECTRIC WATER HEATER 20 GAL STORAGE	---	---	3/4"	3/4"	A.O. SMITH DEL-20	---	20 GALLON STORAGE. 6.0 KW, 208V/1Ø. SET TO 140°	
P-5	URINAL WALL HUNG FLUSH VALVE 1.0 PINT/FLUSH	FLOOR TO RIM 17"	2"	1/2"	---	SLOAN SU-1006	---	PROVIDE FLOOR MOUNTED CARRIER EQUIVALENT TO JAY R SMITH, MODEL 0637	
						SLOAN ROYAL	186-0.5		
P-6	ADA HI/LOW WATER COOLER	WALL HUNG	1-1/2"	1/2"	---	ELKAY EZS8	---	SEE SPECIFICATIONS	
P-7	FLOOR DRAIN	FLUSH	3"	---	---	JOSAM 30003-5A	---	SEE SPECIFICATIONS	



PARTIAL PLUMBING DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

CAMPBELL SPELICY ENGINEERING
3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpelicy.com
Certificate of Authorization: 00008813

PROJECT: 17032 **FIELD ORDER NO.1**



STUDIO M/J/G, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

MP02649 BUILDING 700 - PHASE 1 RENOVATION
University of Florida, 2001
McCarty Dr, Gainesville, FL 32611

FIELD ORDER NO. 1

KEVIN M. SPELICY
PE - 76968

No.	DESCRIPTION	DATE
1	FIELD ORDER NO. 1	8/18/2017

PROJECT NUMBER: 17032
ISSUE DATE: 18 AUGUST 2017
CREATED BY: AEF
CHECKED BY: KMS

P001
PLUMBING LEGEND,
NOTES,
DEMOLITION PLAN
AND SCHEDULE



STUDIO M&J, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJ.COM

**MP02649 BUILDING 700 - PHASE 1
RENOVATION**

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

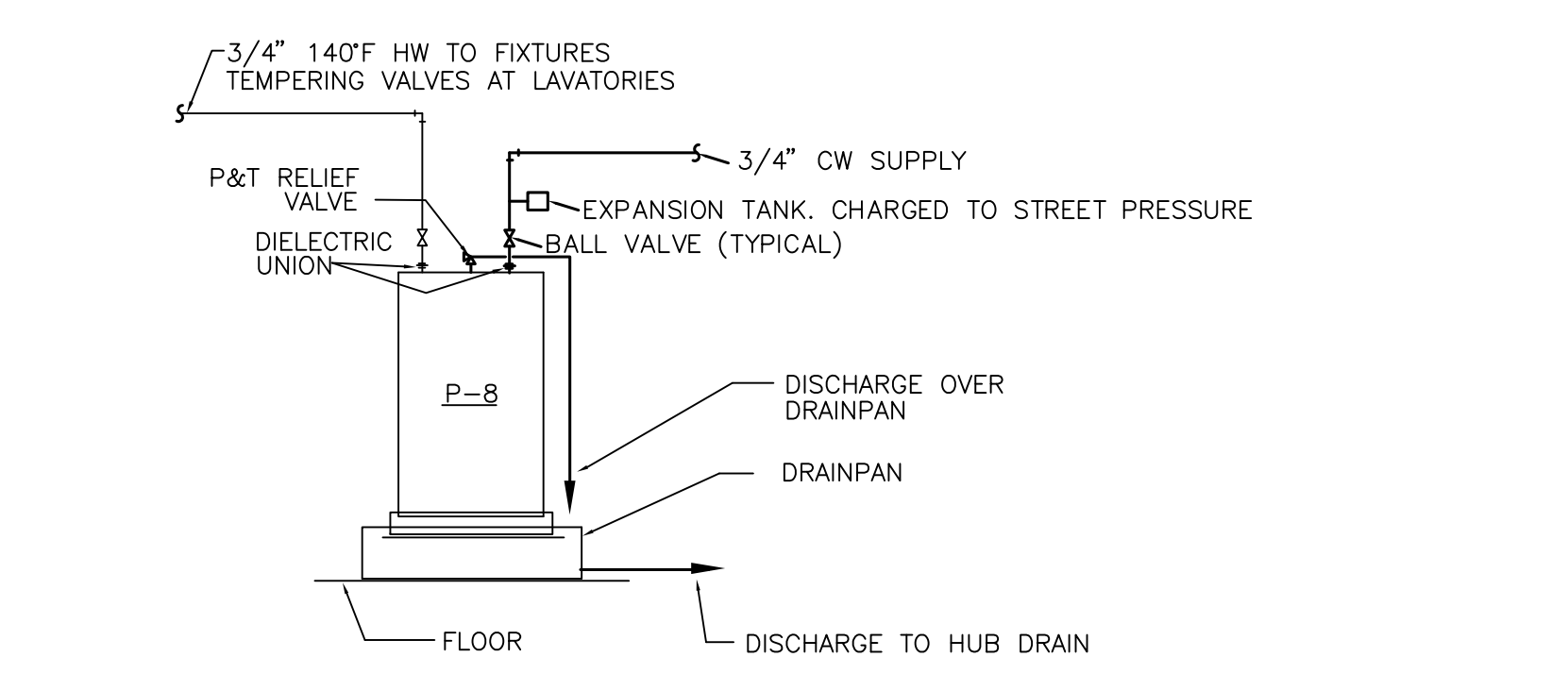
FIELD ORDER NO. 1

KEVIN M. SPELICY
PE - 76968

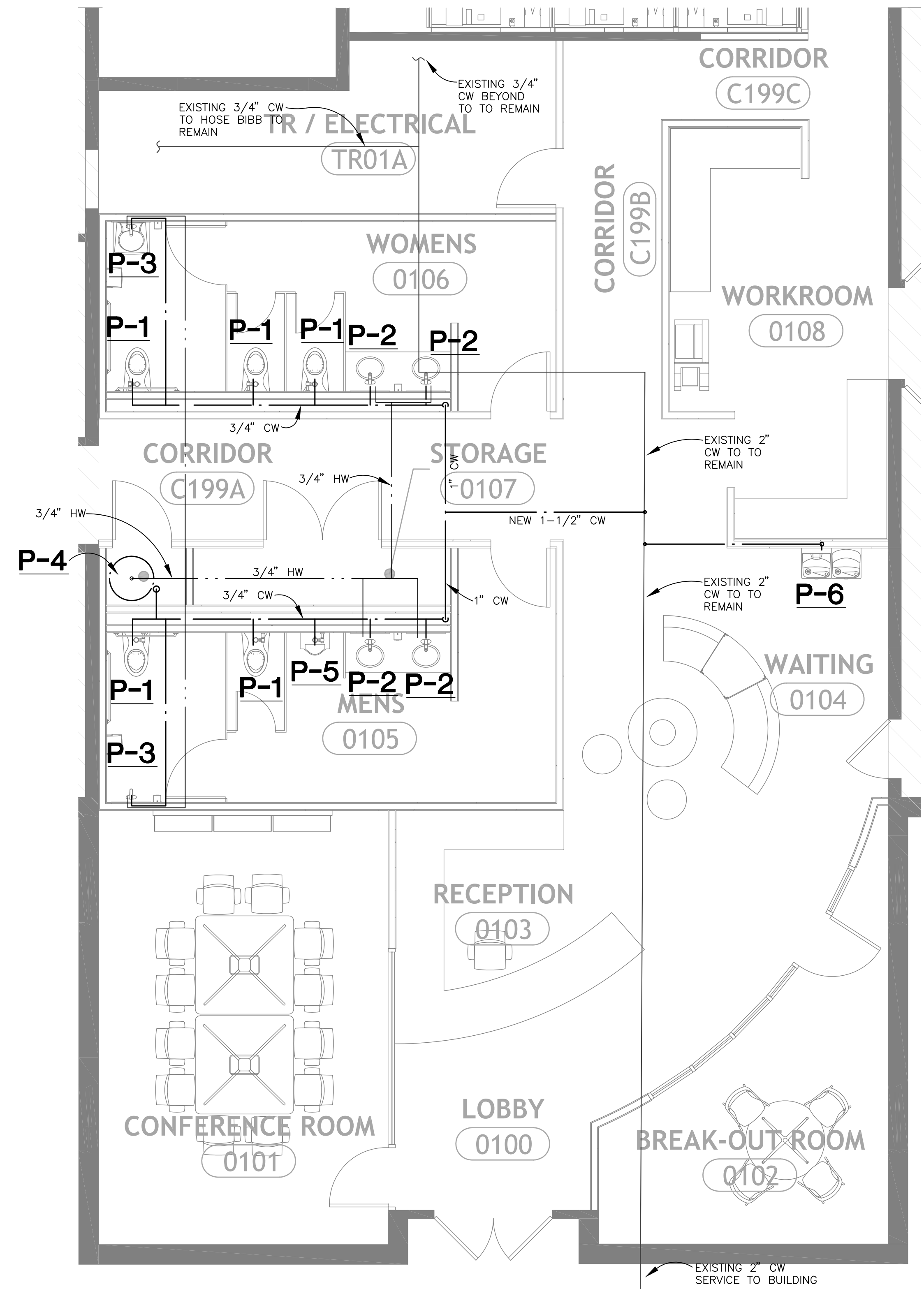
No.	DESCRIPTION	DATE
1	FIELD ORDER NO. 1	8/18/2017

PROJECT NUMBER:	17032
ISSUE DATE:	18 AUGUST 2017
CREATED BY:	AEF
CHECKED BY:	KMS

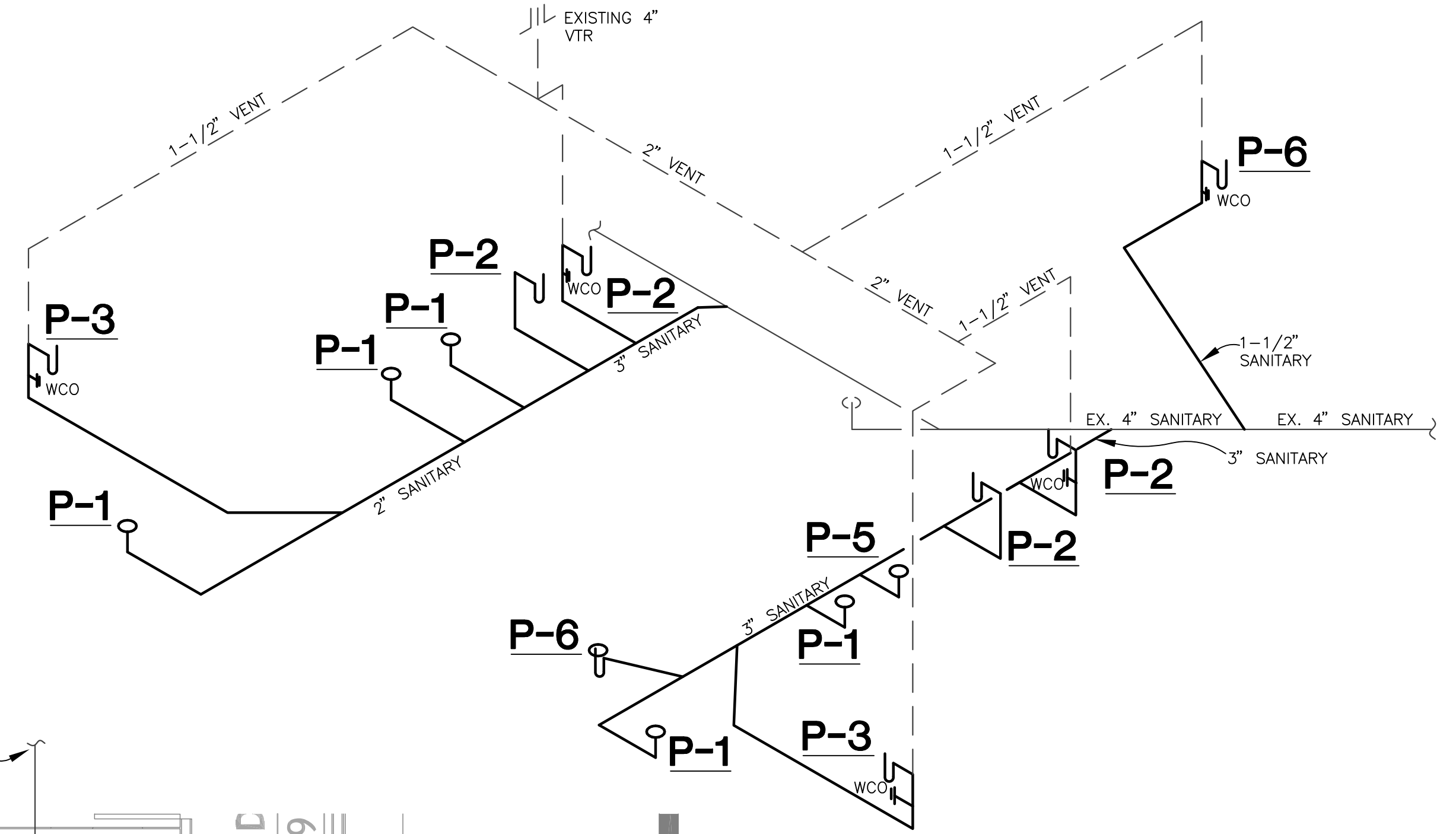
P101
PLUMBING FLOOR
PLANS AND RISER



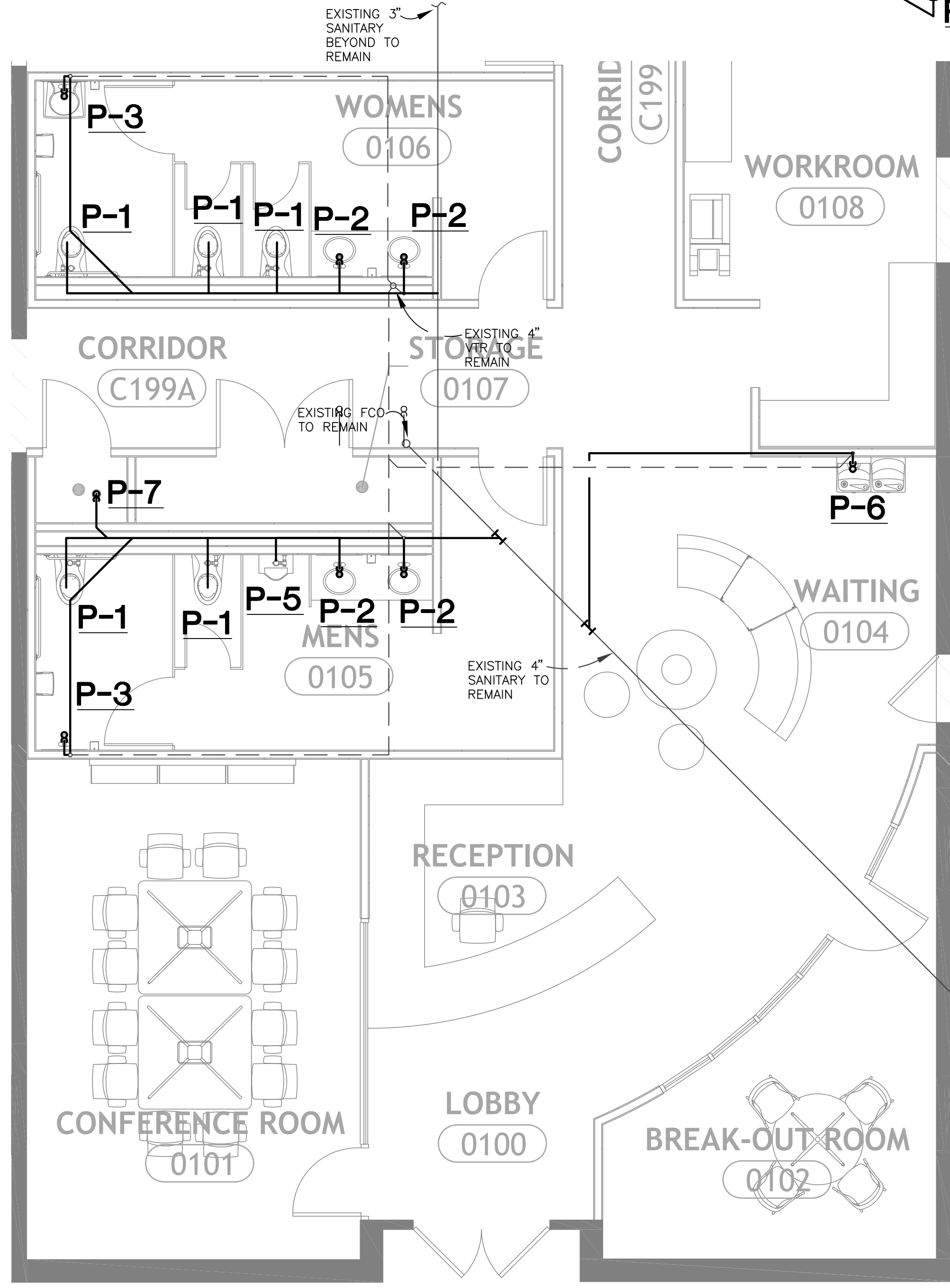
NEW WATER HEATER (P-4) INSTALLATION DETAIL
NOT TO SCALE



PARTIAL PLUMBING PLAN NEW DOMESTIC WATER
SCALE: 1/4" = 1'-0"



**PARTIAL SANITARY
RISER DIAGRAM**
NOT TO SCALE

























PARTIAL PLUMBING PLAN NEW SANITARY PIPING
SCALE: 1/4" = 1'-0"



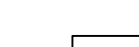
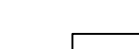
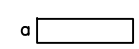













**CAMPBELL
SPELICY
ENGINEERING**

3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpelicy.com
Certificate of Authorization: 00008813

PROJECT: 17032 FIELD ORDER NO.1

ELECTRICAL LEGEND

-  FIRE ALARM PULL STATION MOUNTED 48"A.F.F.
-  FIRE ALARM HORN MOUNTED AT LEAST 90"A.F.F. AND AT LEAST 6" BELOW FINISHED CEILING MEASURED TO TOP OF DEVICE.
-  FIRE ALARM FLASHING LIGHT MOUNTED 80-1/2"A.F.F., TO THE BOTTOM OF THE LENS, UNLESS INDICATED IN A CEILING; STROBE SHALL BE RATED FOR MINIMUM OF 75cd
-  FIRE ALARM HORN AND FLASHING LIGHT MOUNTED 80-1/2"A.F.F., TO THE BOTTOM OF THE LENS, UNLESS INDICATED IN A CEILING; STROBE SHALL BE RATED FOR MINIMUM OF 75cd
-  SMOKE DETECTOR - "D" DENOTES SAMPLING TUBES IN AIR CONDITIONING DUCTWORK
-  FIRE ALARM ANNUNCIATOR
-  FIRE ALARM CONTROL PANEL
-  METER
-  RELAY
-  DATA/TELEPHONE OUTLET - WALL
-  DATA/TELEPHONE OUTLET - FLOOR
-  DATA/TELEPHONE OUTLET - MOUNTED IN MILLWORK
-  DISTRIBUTION SWITCHBOARD OR PANELBOARD
-  BRANCH CIRCUIT PANELBOARD
-  DISCONNECT SWITCH - POLES, RATING AND FUSING AS INDICATED
-  EQUIPMENT CONNECTION OUTLET
-  JUNCTION BOX
-  WALL MOUNTED OCCUPANCY SENSOR WITH BOTH PASSIVE INFRARED (PIR) DETECTION AND ULTRASONIC SOUND DETECTION (MICROPHONICS) DUAL TECHNOLOGY. WALL MOUNTED SENSORS SHALL BE AT NORMAL WALL SWITCH MOUNTING HEIGHT. USE LOW-VOLTAGE TYPE WITH POWER PACKS WITH 20 AMP RATING AS NECESSARY PER MANUFACTURER'S INSTRUCTIONS. THIS IS REQUIRED WHEN MORE THAN ONE SENSOR IS INDICATED CONTROLLING THE SAME LIGHTING SUCH AS IN A LARGER ROOM, WHEN ONLY ONE WALL SENSOR CONTROLS THE SAME LIGHTING FIXTURES LINE-VOLTAGE TYPE MAY BE USED. PROVIDE WATTSTOPPER DW-100 SERIES OR APPROVED EQUAL. REFER TO WWW.LEGRAND.US/WATTSTOPPER.COM FOR DETAILED INFORMATION. ANY MANUAL LIGHT SWITCHES, IF INDICATED, SHALL BE ON THE LOAD SIDE OF THE OCCUPANCY SENSORS; ALL LIGHTING SHALL BE SHUT OFF IN THE EVENT OF OCCUPANCY NOT BEING DETECTED.
-  LOW-VOLTAGE CEILING-MOUNTED OR CORNER-MOUNTED, AS SPECIFIED ON DRAWING, OCCUPANCY SENSOR WITH BOTH PASSIVE INFRARED (PIR) DETECTION AND ULTRASONIC SOUND DETECTION (MICROPHONICS) DUAL TECHNOLOGY. USE LOW-VOLTAGE TYPE WITH POWER PACKS WITH 20 AMP RATING AS NECESSARY PER MANUFACTURER'S INSTRUCTIONS. WATTSTOPPER DT-300 SERIES (CEILING MOUNTED), DT-200 SERIES (CORNER MOUNTED), OR APPROVED EQUAL. REFER TO WWW.LEGRAND.US/WATTSTOPPER.COM FOR DETAILED INFORMATION. ANY MANUAL LIGHT SWITCHES, IF INDICATED, SHALL BE ON THE LOAD SIDE OF THE OCCUPANCY SENSORS; ALL LIGHTING SHALL BE SHUT OFF IN THE EVENT OF OCCUPANCY NOT BEING DETECTED. "C" DENOTES MOUNTING TYPE - WHERE C MEANS CEILING-MOUNTED AND N MEANS CORNER-MOUNTED.
-  SINGLE POLE SWITCH 47-1/2"A.F.F. OR AS INDICATED
-  3-WAY SWITCH 47-1/2"A.F.F. OR AS INDICATED
-  DIMMER WITH ON/OFF SWITCH 47-1/2"A.F.F. OR AS INDICATED

-  CEILING LIGHTING OUTLETS
-  LIGHTED EXIT SIGN - SHADED QUADRANTS DENOTE LIGHTED FACE, ARROWS DENOTE DIRECTION
-  SHADED LIGHTING FIXTURES INDICATE THAT THE FIXTURE HAS AN EMERGENCY BATTERY INVERTER UNIT IN THE BALLAST COMPARTMENT
-  "B" INDICATES THE FIXTURE TYPE
-  LOWER CASE LETTERS "a" AT LIGHTING OUTLETS AND AT SWITCHES INDICATE THE FIXTURE CONTROLLED
-  DUPLEX RECEPTACLE OUTLET WITH GROUND - FLOOR TYPE NEMA 5-20R
-  DUPLEX RECEPTACLE OUTLET WITH GROUND MOUNTED IN MILLWORK - NEMA 5-20R
-  DUPLEX RECEPTACLE OUTLET WITH GROUND - NEMA 5-20R WEATHERPROOF 18"A.F.F.
-  DUPLEX RECEPTACLE OUTLET WITH GROUND FAULT INTERRUPTING 18"A.F.F. - NEMA 5-20R
-  DUPLEX RECEPTACLE OUTLET WITH GROUND MOUNTED 42"A.F.F. OR 8" ABOVE COUNTERTOP (TO CLEAR BACK SPLASH) OR AS INDICATED - NEMA 5-20R
-  DOUBLE DUPLEX RECEPTACLE OUTLET WITH GROUND 18"A.F.F. - NEMA 5-20R
-  DOUBLE DUPLEX RECEPTACLE OUTLET WITH GROUND - FLOOR TYPE NEMA 5-20R
-  DOUBLE DUPLEX RECEPTACLE OUTLET WITH GROUND MOUNTED IN MILLWORK - NEMA 5-20R
-  CONDUIT CONCEALED IN CEILING, WALL OR FLOOR
-  SURFACE MOUNTED CONDUIT
-  HOMERUN TO PANELBOARD. "L1" INDICATES THE PANELBOARD NUMBER. "1,3" INDICATES THE BRANCH CIRCUIT NUMBERS. HATCH MARKS DENOTE NUMBER OF CONDUCTORS EXCLUDING GROUND CONDUCTOR. NO HATCH MARKS DENOTES TWO #12 CONDUCTORS AND ONE #12 GROUNDING CONDUCTOR
-  CONDUIT STUB-UP - CONDUIT IS AT HIGHER ELEVATION ON RIGHT SIDE
-  CABLE TRAY

ELECTRICAL ABBREVIATIONS

- A AMPS
- AC AIR CONDITIONING UNIT
- AFF ABOVE FINISHED FLOOR
- AHU AIR HANDLING UNIT
- AICS AMPS INTERRUPTING CAPACITY SYMMETRICAL
- BKR BREAKER
- C CONDUIT
- CLG CEILING
- CKT CIRCUIT
- CU CONDENSING UNIT
- EF EXHAUST FAN
- EWC ELECTRIC WATER COOLER
- EWH ELECTRIC WATER HEATER
- EX EXISTING TO REMAIN
- FACP FIRE ALARM CONTROL PANEL
- F/A FIRE ALARM
- FLR FLOOR
- GFI GROUND FAULT INTERRUPTER
- GRD GROUND
- HP HEAT PUMP OR HORSEPOWER
- LTG LIGHTING
- MTD MOUNTED
- NEC NATIONAL ELECTRICAL CODE
- P POLE
- PWR POWER
- RE EXISTING TO BE RELOCATED
- RGS RIGID GALVANIZED STEEL
- RV EXISTING TO BE REMOVED
- UNO UNLESS NOTED OTHERWISE
- V VOLTS
- VA VOLT-AMPERES
- W WATTS OR WIRE
- WAP WIRELESS ACCESS POINT
- WP WEATHERPROOF
- ø PHASE

ELECTRICAL NOTES

1. ALL MATERIALS AND LABOR PROVIDED SHALL COMPLY WITH REQUIREMENTS OF THE 2014 EDITION OF THE FLORIDA BUILDING CODE WITH ALL ADOPTED AMENDMENTS.
2. ALL BRANCH CIRCUITS SHALL BE PROVIDED WITH AN INDEPENDENT AND SEPARATE GROUNDING CONDUCTOR (NEUTRAL) WHICH IS NOT SHARED BY ANY OTHER CIRCUITS, UNLESS THE BRANCH CIRCUITS WHICH SHARE THE SAME NEUTRAL ALL SUPPLY THE SAME INDIVIDUAL ELECTRICAL LOAD SUCH AS THE SAME 3-PHASE MOTOR.
3. WHERE TWO SWITCHES ARE SHOWN CONTROLLING THREE OR FOUR LAMP FIXTURES, THE INSIDE LAMP(S) OF EACH FIXTURE SHALL BE ON ONE SWITCH (OR CIRCUIT) AND THE OUTSIDE LAMPS OF EACH FIXTURE SHALL BE ON THE OTHER SWITCH (OR CIRCUIT), WHERE TWO SWITCHES ARE SHOWN CONTROLLING TWO LAMP FIXTURES, THE LEFT AND RIGHT LAMPS OF EACH FIXTURE SHALL BE CONTROLLED BY SEPARATE SWITCHES.
4. COORDINATE LOCATIONS OF ELECTRICAL EQUIPMENT, DEVICES, OUTLETS, FIXTURES, ETC. WITH ARCHITECTURAL PLANS, ELEVATIONS, AND REFLECTED CEILING PLANS PRIOR TO ROUGH-IN WORK. DO NOT SCALE ELECTRICAL DRAWINGS.
5. INSTALL ALL CEILING MOUNTED SPEAKERS TO AVOID CONFLICTS WITH AIR DEVICES, LIGHTS, SPRINKLERS, ETC.
6. INSTALL 4' X 4' AND 2' X 2' FIXTURE SUCH THAT LAMPS ARE PARALLEL IN SAME VISUAL AREA.
7. THERE SHALL BE NO WALL OUTLETS INSTALLED BACK TO BACK; OFFSET TWELVE INCHES MINIMUM.
8. ALL WIRE SHALL BE COPPER.
9. INSTALL 1" CONDUIT (OR SIZE AS INDICATED) FROM EACH TELEPHONE OUTLET TO THE NEAREST TELEPHONE BACKBOARD OR CABINET.
10. STUB AND CAP THREE 3/4" EMPTY CONDUITS TO ABOVE CEILING FROM EACH RECESSED MOUNTED PANELBOARD. THESE CONDUITS SHALL BE ACCESSIBLE FOR FUTURE CIRCUIT INSTALLATION.
11. ALL RACEWAY FOR THE FIRE ALARM SYSTEM SHALL BE RED AND SHALL BE 3/4" CONDUIT MINIMUM.
12. UNLESS INDICATED OTHERWISE, COMMUNICATION BOXES SHALL BE 4-11/16" X 4-11/16" X 2-1/8" DEEP WITH SINGLE DEVICE COVER PLATES.
13. PROVIDE 6'-0" MINIMUM PIG TAIL OF #6 COPPER GROUND WIRE AT EACH TELEPHONE BACKBOARD. CONNECT TO BUILDING GROUND.
14. RECEPTACLES AND COVER PLATES CONNECTED TO THE EMERGENCY SYSTEM SHALL BE COLORED RED.
15. PROVIDE AN INSULATED GROUNDING CONDUCTOR IN ALL FEEDER AND BRANCH CIRCUITS.
16. PROVIDE A 6'-0" MAXIMUM FLEXIBLE CONNECTION FROM EACH RECESSED LIGHTING FIXTURE TO JUNCTION BOX ABOVE CEILING.
17. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO PROPERLY RECYCLE (IF POSSIBLE) OR OTHERWISE TO PROPERLY DISPOSE OF ALL EXISTING ELECTRICAL ITEMS (LIGHTS, CLOCKS, SPEAKERS, ETC.) THAT HAVE BEEN REMOVED AND NOT REINSTALLED - UNLESS STATED OTHERWISE BY OWNER.
18. REMOVE ALL UNUSED EXISTING EXPOSED CONDUIT, WIRE, AND BOXES. PULL OUT ALL WIRE FROM EXISTING CONCEALED CONDUIT THAT HAS BEEN ABANDONED.
19. DRAWINGS MAY INDICATE THE REUSE OF SOME EXISTING OUTLET BOXES OR RACEWAY. WHERE IT IS IMPRACTICAL OR NON-COMPLIANT WITH THE NEC BECAUSE OF JOB CONDITIONS TO REUSE AN OUTLET BOX OR RACEWAY, CONTRACTOR SHALL PROVIDE NEW OUTLET BOX OR RACEWAY AS REQUIRED.
20. CONTRACTOR SHALL REPAIR - TO ORIGINAL CONDITION TO OWNER'S SATISFACTION - ANY EXISTING WALL, FLOOR, CEILING, OR OTHER EXISTING ITEMS REMOVED, ALTERED, OR DAMAGED DURING CONSTRUCTION.
21. IN ORDER TO MINIMIZE BALLAST QUANTITY, TANDEM WIRING OF FIXTURE BALLASTS SHALL BE USED WHEREVER PRACTICAL DUE TO FIXTURE PROXIMITY, WHEN DOUBLE SWITCHING IS USED FOR LIGHTING FIXTURES. ALSO, EVEN IF DOUBLE SWITCHING IS NOT INDICATED, WHENEVER TWO OR MORE ONE OR THREE-LAMP LIGHTING FIXTURES IN THE SAME SPACE ARE INDICATED AS BEING CONTROLLED BY THE SAME SWITCH OR SWITCHES, TANDEM WIRING OF FIXTURE BALLASTS SHALL BE USED IF REQUIRED BY FLORIDA BUILDING CODE 505.3 (2010 ED.). SEE THE EXCEPTIONS FOR THIS CODE REQUIREMENT IN THIS PORTION OF THE FLORIDA BUILDING CODE.
22. MOUNTING TOLERANCES FOR FIRE ALARM DEVICES IS ±1/2".
23. REMOVE EXISTING ELECTRICAL EQUIPMENT ONLY AS INDICATED. PROVIDE MATERIALS AND LABOR NECESSARY TO MAINTAIN EXISTING ELECTRICAL POWER OR COMMUNICATIONS SUPPLIES TO EQUIPMENT, DEVICES, FIXTURES, OR OTHER EXISTING ITEMS TO REMAIN.
24. REPLACE EXISTING RECEPTACLES NOT CONFORMING WITH N.E.C. WITH APPLICABLE NEMA GROUNDING TYPE.
25. IF EXISTING FIXTURES ARE REINSTALLED OR RELOCATED, AFFECTED FIXTURES SHALL BE STORED SAFELY; CLEANED; AND SHALL HAVE NEW BALLASTS, LENSES, AND LAMPS PROVIDED, AS NECESSARY.
26. THE CONTRACTOR SHALL REROUTE EXISTING CIRCUITS OR PROVIDE NEW CIRCUITS AS REQUIRED TO MAINTAIN ELECTRICAL POWER OR COMMUNICATIONS SUPPLIES TO FIXTURES, DEVICES, OUTLETS, OR OTHER EXISTING ITEMS TO REMAIN WHICH ARE SUPPLIED BY ITEMS TO BE REMOVED OR RELOCATED.
27. DIVISION 16 DESIGN PROVIDES A NUMBER OF BRANCH CIRCUITS, PHASES, AMPACITY, AND OVERCURRENT PROTECTION DEVICES FOR DESIGN-BASIS EQUIPMENT (PROVIDED BY DIVISION 15 OR OTHER DIVISIONS OF THIS CONTRACT) CONFORMING TO MANUFACTURER'S SPECIFICATIONS AND REQUIREMENTS AVAILABLE AT TIME OF DESIGN. IF REQUIREMENTS OF EQUIPMENT ACTUALLY PROVIDED UNDER CONTRACT FOR CONSTRUCTION ARE DIFFERENT, CONTRACTOR SHALL MAKE ALL CHANGES REQUIRED WITHOUT INCREASE IN THE CONTRACT AMOUNT OR TIME SCHEDULE. SUCH CHANGES REQUIRED MAY INCLUDE - BUT SHALL NOT BE LIMITED TO - QUANTITY AND SIZE OF WIRES; QUANTITY AND SIZE OF CONDUITS; AND QUANTITY, TYPE, AND SIZE OF CIRCUIT BREAKERS, FUSE PROTECTION, AND DISCONNECT SWITCHES. DIVISION 16 SYSTEM SHALL COMPLY WITH REQUIREMENTS OF EQUIPMENT PROVIDED BY OTHER DIVISIONS OF THIS CONTRACT EVEN IF DIFFERENT FROM DESIGN-BASIS REQUIREMENTS.
28. CONTRACTOR SHALL PROVIDE ADDITIONAL JUNCTION BOXES, CONDUCTORS, AND OTHER MATERIALS AND LABOR NECESSARY TO CONNECT PARALLEL OR OVERSIZED FEEDER RUNS WHERE SUCH FEEDERS EXCEED CONNECTION CAPACITY OF CIRCUIT BREAKERS, PANELBOARDS, AND OTHER CONNECTION POINTS.
29. RISER DIAGRAMS SHOW ONLY THE GENERAL CONFIGURATION OF SYSTEMS SHOWN. REFER TO THE APPROPRIATE DRAWINGS FOR EXACT DEVICE, QUANTITIES, AND LOCATIONS.
30. EXIT SIGNS SHALL REMAIN ON CONTINUOUSLY AND SHALL NOT BE SWITCHED. ANY LIGHTING FIXTURES WHICH ARE INDICATED WITH EMERGENCY BATTERY INVERTER PACKS SHALL BE PROVIDED WITH AN UNSWITCHED CIRCUIT FROM THE SAME CIRCUIT BREAKER SUPPLYING THAT LIGHTING FIXTURE SO THAT THE BATTERY INVERTER PACK CAN SENSE THE AVAILABILITY OF NORMAL POWER TO THAT FIXTURE. BATTERY PACK SHALL AUTOMATICALLY ILLUMINATE FIXTURE IN THE EVENT OF LOSS OF POWER FROM THAT CIRCUIT BREAKER REGARDLESS OF THE SWITCH POSITION OF ANY MANUAL OR AUTOMATIC SWITCHING CONTROLLING THE LIGHTING FIXTURE.
31. ALL RECEPTACLES IN TOILET ROOMS, OUTSIDE, AND WITHIN 6'-0" OF A SINK OR OTHER SOURCE OF WATER SHALL BE A GROUND FAULT INTERRUPTER (GFI) RECEPTACLE. CONTRACTOR MAY NOT USE GROUND FAULT CIRCUIT BREAKERS AND SHALL NOT FEED THROUGH A GROUND FAULT INTERRUPTER RECEPTACLE TO SERVE OTHER RECEPTACLES.
32. PROVIDE A SINGLE GFI RECEPTACLE OUTLET AT EACH ELECTRIC WATER COOLER (EWC) AND LOCATE BEHIND UNIT. COORDINATE EXACT LOCATION WITH DIVISION 15.
33. ELECTRICAL CONTRACTOR SHALL WORK CLOSELY WITH THE MASONRY CONTRACTOR ON THE INSTALLATION OF ALL ELECTRICAL BOXES, CABINETS, EXTENSION RINGS, ETC. IN MASONRY WALLS. THE BOXES SHALL BE INSTALLED AT THE UNIFORM HEIGHTS CALLED FOR ON THE DRAWINGS AND SPECIFICATIONS. PROVIDE 2" DEEP MASONRY EXTENSION RINGS FOR ALL OUTLETS IN MASONRY WALLS TO INSURE PROPER CUTTING AND FITTING. THE FACE OF THE CABINETS, BOXES, EXTENSION RINGS, ETC. SHALL BE PLUMB AND FLUSH WITH THE FACE OF THE FINISH MATERIAL. ANY CABINET, OUTLET BOX, ETC. NOT MEETING THE ABOVE REQUIREMENT SHALL BE REMOVED AND REINSTALLED AT NO ADDITIONAL COST TO THE OWNER.
34. ELECTRICAL CONTRACTOR SHALL SECURELY MOUNT ALL OUTLET BOXES MOUNTED IN DRYWALL. CEILINGS TO THE METAL STUD SYSTEM. PROVIDE PROPER EXTENSION RINGS SO THAT OUTSIDE EDGE OF RING IS FLUSH WITH FINISH CEILING. ANY OUTLET BOX NOT MEETING THE ABOVE REQUIREMENT SHALL BE REMOVED AND REINSTALLED AT NO ADDITIONAL COST TO THE OWNER.
35. ELECTRICAL CONTRACTOR SHALL PROVIDE ADEQUATE AND PROPER SUPPORT FOR ALL ELECTRICAL OUTLETS, DEVICES, LIGHT FIXTURES, ETC. BUILT IN OR MOUNTED ON CEILINGS. NO OUTLET BOX, DEVICE, LIGHT FIXTURE, ETC. SHALL BE SUPPORTED FROM ANY ACOUSTICAL CEILING TILE OR DRYWALL CEILINGS. PROVIDE METAL SUPPORTS THAT ARE MADE FOR USE WITH CEILING GRID SYSTEMS OR PROVIDE HANGERS FROM STRUCTURE ABOVE. PROVIDE MATERIALS AND LABOR NECESSARY TO COMPLY WITH NEC 300.11.
36. THE CONTRACTOR SHALL INSTALL COVERS ON ALL JUNCTION BOXES LOCATED ABOVE CEILING PRIOR TO ACOUSTICAL CEILING TILE INSTALLATION.
37. JUNCTION BOXES LOCATED ABOVE CEILING SHALL BE INSTALLED FACING DOWN AND SHALL BE ACCESSIBLE AFTER INSTALLATION. COORDINATE WITH OTHER TRADES AND STRUCTURE.
38. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL WALL AND FLOOR OUTLET LOCATIONS WITH MILLWORK DRAWINGS, LOCATIONS OF CHALKBOARDS, TACKBOARDS, FURNITURE PLANS, AND ANY OTHER APPLICABLE ARCHITECTURAL DRAWINGS PRIOR TO INSTALLATION OF ANY BOXES.
39. ALL ELECTRICAL EQUIPMENT, DEVICES, ETC. LOCATED OUTDOORS SHALL BE WEATHERPROOF.
40. REFER TO ARCHITECTURAL DRAWINGS FOR PHASING OF CONSTRUCTION, TEMPORARY AND PERMANENT FENCES, AND ALL CONCRETE WORK.
41. EXISTING UTILITIES AND OTHER UNDERGROUND OR CONCEALED ITEMS ARE SHOWN FOR REFERENCE ONLY. ADDITIONAL ITEMS NOT SHOWN ARE LIKELY TO BE PRESENT AND LOCATIONS MAY DIFFER FROM THAT SHOWN. CONTRACTOR SHALL EXCAVATE AND CONDUCT DEMOLITION AS NECESSARY TO AVOID DAMAGE TO EXISTING ITEMS, SHALL NOTIFY OWNER AND ENGINEER AT ONCE OF ALL DAMAGE, AND SHALL REPAIR DAMAGE TO ORIGINAL CONDITION TO THE SATISFACTION OF THE OWNER AND ENGINEER.
42. ALL RACEWAY PROVIDED SHALL BE CONCEALED UNDERGROUND, IN FLOORS, IN CEILINGS, OR IN WALLS UNLESS NOTED OTHERWISE.
43. PROVIDE PERMANENT MARKER LABELING (WHICH IS NOT PAINTED OVER) ON ALL BOXES OR DEVICES PROVIDED WHICH INDICATES PANELBOARD NAME AND CIRCUIT NUMBER IN AN ACCESSIBLE LOCATION. LABELING SHALL BE VISIBLE WITHOUT REMOVING DEVICE FROM BOX BUT SHALL NOT BE VISIBLE UNLESS COVERPLATE OR CEILING TILES ARE REMOVED.
44. PROVIDE MATERIALS AND LABOR NECESSARY TO INDICATE CIRCUIT NUMBER FOR EACH SWITCH OR RECEPTACLE PROVIDED AS FOLLOWS: DEVICE SHALL BE LABELED WITH 1/4-INCH MINIMUM HEIGHT VINYL CLOTH ADHESIVE MARKER (THOMAS AND BETTS E-2 CODE MARKERS, OR APPROVED EQUAL) IN A LOCATION WHICH IS VISIBLE WITH ONLY THE REMOVAL OF THE DEVICE COVERPLATE. LABELING SHALL NOT BE VISIBLE WITH COVERPLATE INSTALLED.

DEMOLITION NOTES

1. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO REMOVE ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE REMOVED; TO REMOVE, STORE, CLEAN, AND REINSTALL ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE RELOCATED; AND TO NOT DISTURB ANY OTHER ELECTRICAL ITEMS EXCEPT AS NECESSARY TO ACCOMMODATE OTHER WORK SPECIFIED. ALL EXISTING DEVICES, STRUCTURES, EQUIPMENT OR OTHER FEATURES SHALL BE CONSIDERED TO BE EXISTING TO REMAIN UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO PROTECT ANY EXISTING OR NEW SMOKE DETECTORS, IF ANY, DURING DEMOLITION AND CONSTRUCTION TO ENSURE NO PARTICULATE MATTER MAY ENTER THESE DETECTORS.
3. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY AND SHALL SCHEDULE WORK AS NECESSARY TO ENSURE THAT OUTAGES TO THE SERVICE OF FIRE ALARM DEVICES ARE MINIMIZED. ALL OUTAGES TO SUCH FIRE ALARM SYSTEM COMPONENTS, IF ANY, SHALL BE COORDINATED WITH THE OWNER AND CONDUCTED DURING TIMES SPECIFIED BY OWNER; SEE PROJECT MANUAL DIVISION ONE.
4. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO MAINTAIN IN SERVICE DURING DEMOLITION AND CONSTRUCTION THOSE EXISTING FIRE ALARM SYSTEM COMPONENTS WHICH ARE OUTSIDE THE RENOVATION AREA EVEN IF THESE COMPONENTS ARE SUPPLIED BY OR SERVED BY MATERIALS TO BE REMOVED, MATERIALS TO BE RELOCATED, OR OTHER MATERIALS WITHIN THE RENOVATION AREA.
5. CONTRACTOR SHALL REMOVE ALL UNUSED CONDUCTORS BACK TO SOURCE OR TO THE FIRST JUNCTION POINT SUPPLYING EXISTING OR NEW LOADS TO REMAIN.
6. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY TO RESUPPLY OR TO MAINTAIN IN SERVICE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY ELECTRICAL ITEMS OUTSIDE OF THE RENOVATION AREA WHICH ARE SERVED BY OR SUPPLIED BY ELECTRICAL ITEMS WITHIN THE RENOVATION AREA.
7. ALL EXPOSED UNUSED CONDUIT SHALL BE REMOVED. ALL UNUSED CONCEALED CONDUIT SHALL BE ABANDONED IN PLACE AFTER INSTALLING A PULLSTRING.
8. DEVICES SHOWN INSIDE THE RENOVATION AREA ARE NOT INTENDED TO REPRESENT ALL DEVICES WITHIN SPACE. ADDITIONAL DEMOLITION WORK MAY BE REQUIRED FOR INSTALLING NEW WORK. CONTRACTOR SHALL ASSUME ADDITIONAL ITEMS NOT INDICATED ARE PRESENT AND SHALL THOROUGHLY INSPECT PROJECT AREA PRIOR TO BIDDING.
9. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO REPAIR OR TO REPLACE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY EXISTING DEVICES, FINISHES, SURFACES, OR EQUIPMENT TO REMAIN WHICH IS DAMAGED DURING DEMOLITION OR CONSTRUCTION WITH NO CHANGE TO THE CONTRACT AMOUNT OR TIME SCHEDULE.
10. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO EXTEND, RELOCATE, ADD TO, OR REPLACE (AS NECESSARY) FIRE ALARM AND POWER CONDUITS AND CONDUCTORS IN ORDER TO ACCOMMODATE RELOCATION, REMOVAL, OR REINSTALLATION OF ANY ELECTRICAL ITEMS WHICH ARE SO INDICATED.
11. DEMOLITION SHALL INCLUDE ANY REMOVAL AND REPLACEMENT OF EXISTING MATERIALS TO MAKE PREVISION FOR NEW FINISHES IF REQUIRED TO ACCOMMODATE WORK BY OTHER DIVISIONS OF THIS CONTRACT.
12. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO PERFORM ELECTRICAL DEMOLITION NECESSARY TO ACCOMMODATE ARCHITECTURAL WORK SPECIFIED ON DEMOLITION SHEET. COORDINATE EXACT REQUIREMENTS WITH ARCHITECTURAL DOCUMENTS AND FIELD CONDITIONS PRIOR TO BID.



STUDIO M.J.G., LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

MP02649 BUILDING 700 - PHASE 1

RENOVATION

University of Florida, 2001

McCarthy Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE
△	FIELD ORDER NO.1	8/18/2017

PROJECT NUMBER:	17032
ISSUE DATE:	18 AUGUST 2017
CREATED BY:	JSA
CHECKED BY:	TWS

E001

ELECTRICAL ABBREVIATIONS, LEGEND, & NOTES



**CAMPBELL
SPELLICY
ENGINEERING**

3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

PROJECT: 17032

FIELD ORDER NO.1



STUDIO MJG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIJMG.COM

**MP02649 BUILDING 700 - PHASE 1
RENOVATION**
University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE
1	FIELD ORDER NO.1	8/18/2017

PROJECT NUMBER: 17032
ISSUE DATE: 18 AUGUST 2017
CREATED BY: JSA
CHECKED BY: TWS

E101
ELECTRICAL DEMO
FLOOR PLAN,
NOTES, & ONE-LINE
DIAGRAM

**MASTER PLAN NOTES
ELECTRICAL DESIGN INTENT**

1. UNDER A FUTURE PHASE THE EXISTING "AC" PANEL SUPPLYING HVAC LOADS BEING REMOVED, SUCH AS CONDENSING UNITS OD-1A AND OD-1B, WILL BE RELOCATED TO ELECTRICAL ROOM TR01A. PANELS "MA" AND "PA" WILL BE RELOCATED TO WITHIN A NEW ELECTRICAL ROOM BEING BUILT ON THE EAST WING OF THE BUILDING. NEW PANELBOARDS ARE NOT PROJECTED TO BE REQUIRED FOR THE RENOVATION IN THE FUTURE PHASE - AFOREMENTIONED PANELS ARE IN GOOD CONDITION AND CAN BE REUSED.
2. NEW LIGHTING FIXTURES MATCHING THOSE SPECIFIED UNDER THIS CONTRACT, WILL BE PROVIDED. OCCUPANCY SENSORS IN ALL CODE REQUIRED SPACES WILL ALSO BE PROVIDED.

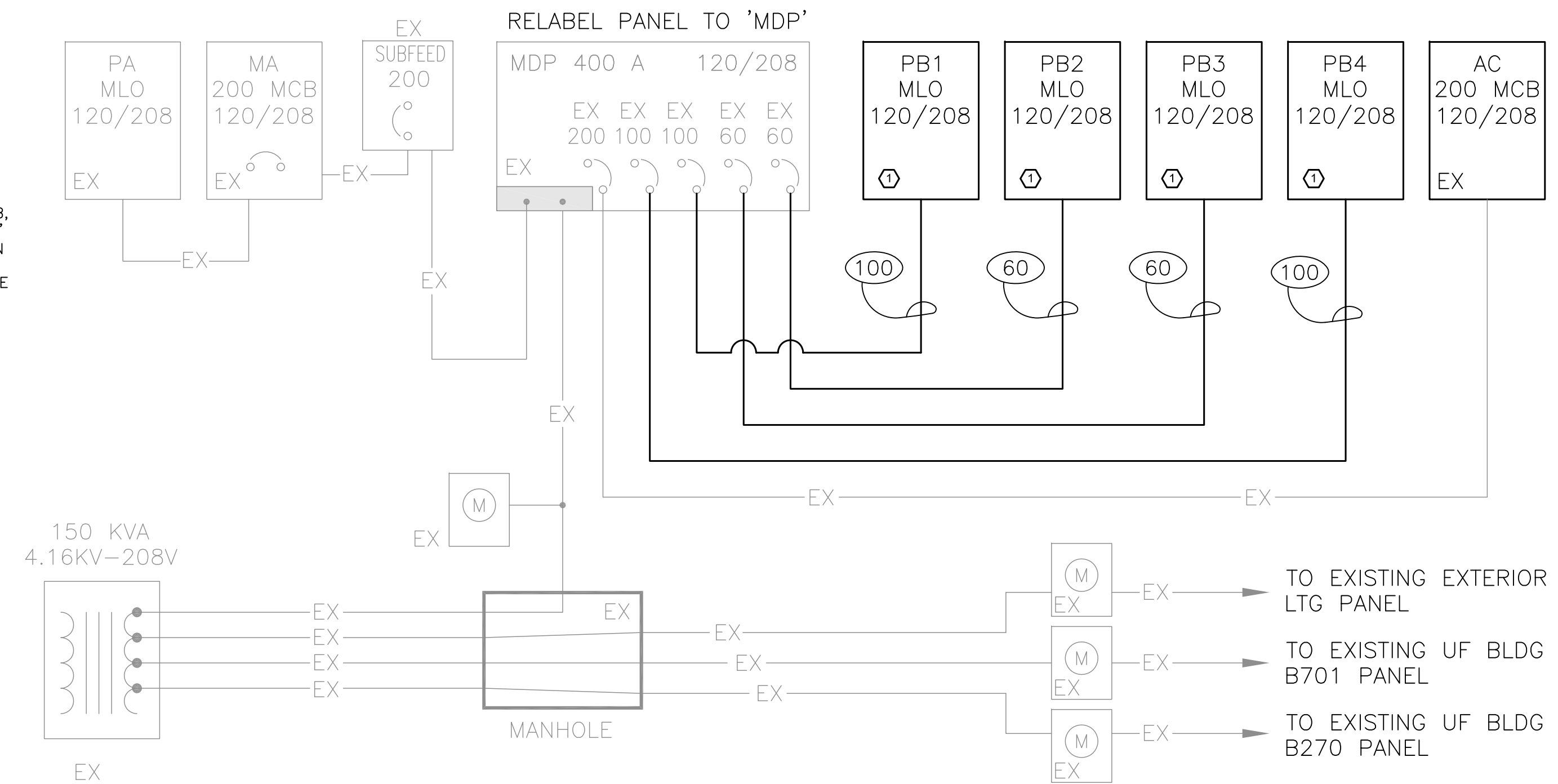
CHANGES THIS SHEET FROM 100% CONSTRUCTION DOCS:
 • UPDATED POWER DISTRIBUTION ONE LINE DIAGRAM TO REFLECT TRANSFORMER UPGRADE PROJECT - OUTSIDE OF SCOPE OF THIS PROJECT.



LIMITS OF ELECTRICAL DEMOLITION
 PROVIDE MATERIALS AND LABOR NECESSARY TO REMOVE ALL ELECTRICAL DEVICES AND LIGHTING FIXTURES FROM THIS AREA AS NECESSARY TO ACCOMMODATE DEMOLITION AND NEW CONSTRUCTION, UNO. COORDINATE WITH FIELD CONDITIONS PRIOR TO PRICING. ALL UNUSED CONDUIT AND CONDUCTORS SHALL BE REMOVED BACK TO FIRST JUNCTION BOX SUPPLYING LOADS TO REMAIN OR BACK TO PANEL BOARD. REMOVE ALL EXISTING FIRE ALARM DEVICES BUT DO NOT REMOVE CONDUCTORS AND CONDUIT SUPPLYING THOSE FIRE ALARM DEVICES, CONDUCTORS AND CONDUIT SHALL BE EXTENDED TO SUPPLY NEW DEVICES; COORDINATE WITH SHEET E2.1.

GENERAL NOTES:

1. ELECTRICAL GROUNDING SYSTEM SHALL BE IN COMPLIANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NFPA 70).
2. ALL NEW BREAKERS SHALL BE RATED FOR 22 KAIC.
3. NOT USED.
4. NEW FUSES IN MDP (EXISTING MAIN DISTRIBUTION PANEL) SHALL MATCH EXISTING.
5. ALL PANELS IN PHASE 1 SHALL BE LABELED WITH PERMANENT LABELS INDICATING AMPERAGE, IDENTIFICATION, FEEDER AND VOLTAGE AND ARC FLASH.
6. ALL PANELS SHALL BE LABELED AS REQUIRING ARC FLASH PROTECTION PPE 1.
7. ALL PANELS SHALL REQUIRE NEW TYPE WRITTEN PANEL DIRECTORIES, SHOWING BREAKER AMPS POLES AND CONNECTED LOAD, DIRECTORY COPY SHALL BE PROVIDED TO OWNER ON MEMORY STICK (MS-WORD).



POWER DISTRIBUTION ONE LINE DIAGRAM

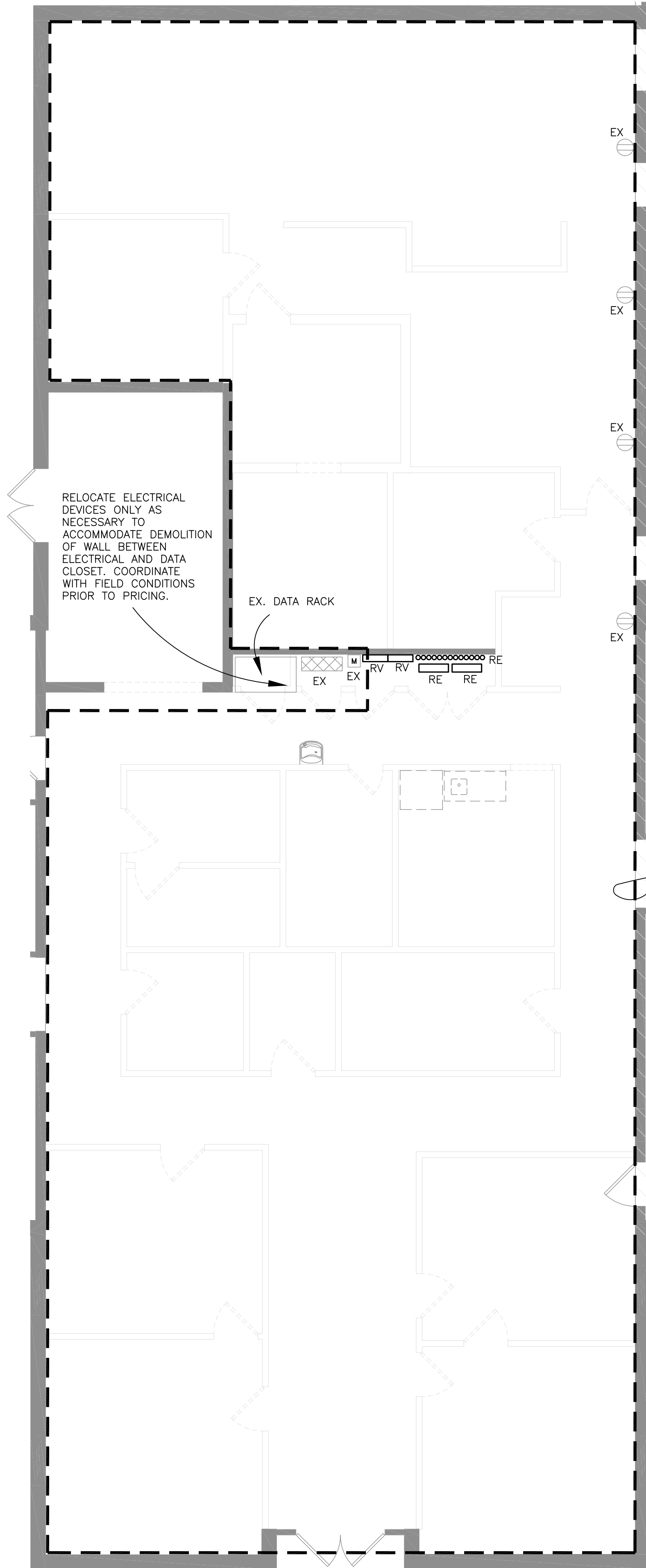
NOTES: PROVIDE NEW PANELS IN NEW LOCATION, BOND TO BUILDING STEEL, SEE ELECTRICAL PARTIAL FLOOR PLAN - POWER.

FEEDER SCHEDULE

- 60 4#6, 1#8GRD. 1"C.
- 100 4#3, 1#8GRD. 1 1/4"C.

LOAD DESCRIPTION	PANEL [INSERT PANEL NAME]				KVA
	A	B	C	V	
† METERED LOAD				120	50.6
‡ EXISTING LOAD					
‡ LOAD BEING REMOVED (-)	119	129	125	120	44.8
LOAD BEING ADDED (+)	188	202	199	120	70.7
RESULTANT LOAD	209.5	213.5	214.5	120	76.5
CALCULATED CONNECTED LOAD (AMPS)	212.5	CALCULATED CONNECTED LOAD			76.5
RATED PANEL CAPACITY (AMPS)	400	TRANSFORMER CAPACITY			150
† FROM METERING DATA					
‡ CALCULATED USING AS-BUILT DRAWINGS AND PANEL DIRECTORIES					
NO UPGRADES TO DISTRIBUTION PANEL OR TRANSFORMER REQUIRED					

LOAD SUMMARY TABLE



ELECTRICAL PARTIAL DEMOLITION FLOOR PLAN
 SCALE: 3/16" = 1'-0"

**CAMPBELL
SPELICY
ENGINEERING**

3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

PROJECT: 17032 FIELD ORDER NO.1



STUDIO MJG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - PHASE 1
RENOVATION**
University of Florida, 2001
McCarthy Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE
1	FIELD ORDER NO. 1	8/18/2017

PROJECT NUMBER:	17032
ISSUE DATE:	18 AUGUST 2017
CREATED BY:	JSA
CHECKED BY:	TWS

E201
ELECTRICAL
POWER FLOOR
PLAN & SPECS
RISERS

**CAMPBELL
SPELICY
ENGINEERING**

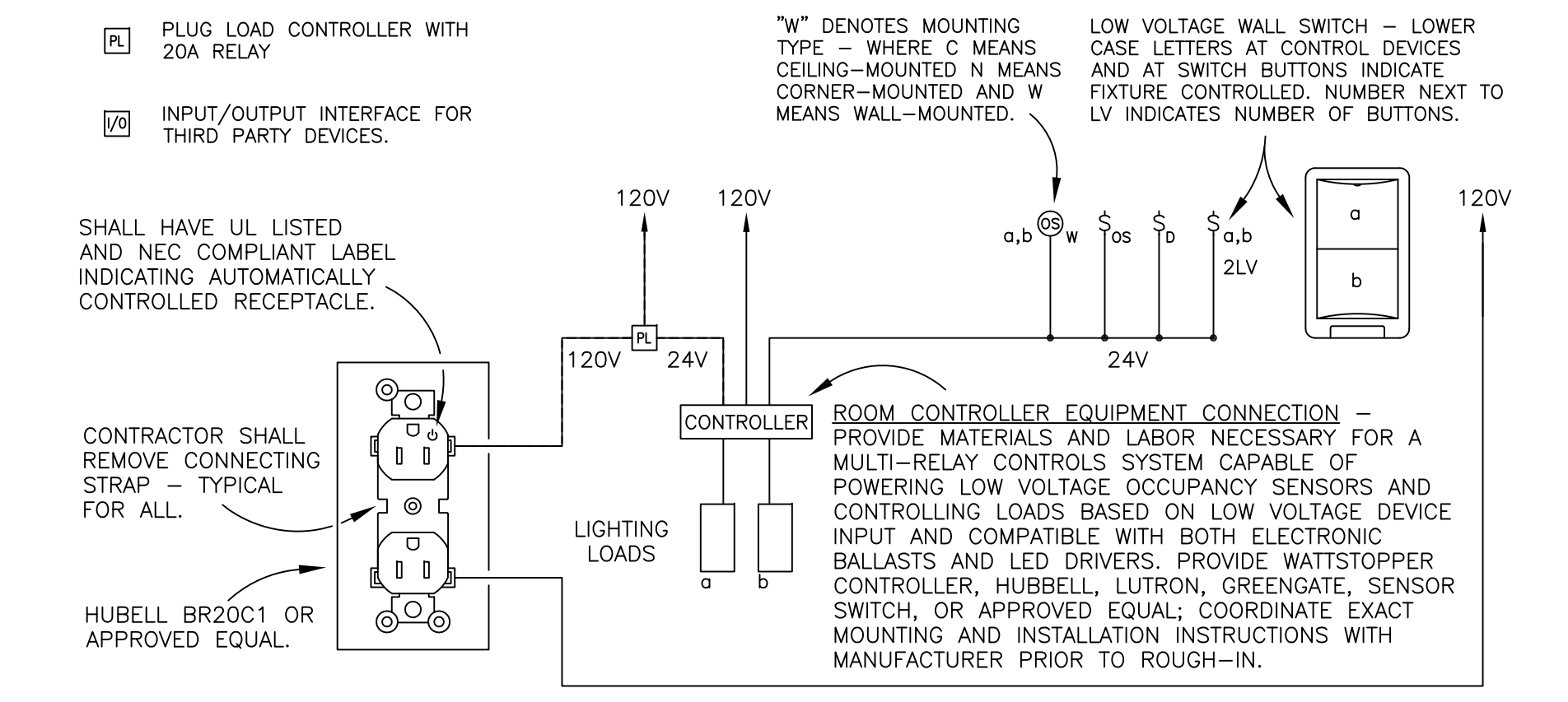
3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpelicy.com
Certificate of Authorization: 00008813

PROJECT: 17032 FIELD ORDER NO.1

KEY NOTES:

- EXISTING HALF DATA RACK TO REMAIN. DEVICE SHALL REMAIN OPERATIONAL THROUGHOUT CONSTRUCTION AND SHALL BE PROTECTED FROM DUST AND DEBRIS.
- EXISTING SUBFED ENCLOSURE FOR 'MA' PANEL TO REMAIN.
- EXISTING 400A 'GENERAL ELECTRIC' FUSED DISTRIBUTION PANEL, TYPE QM2 (AND 200A DISC), TO REMAIN. RELABEL AS 'MDP' AND PROVIDE ACCURATE AND UP-TO-DATE PANEL DIRECTORY.
- RELOCATE EXISTING SECURITY SYSTEM PANELS TO APPROXIMATELY THIS LOCATION ON WALL. EXTEND CABLES AND RACEWAY AS NECESSARY TO ACCOMMODATE RELOCATION OF DEVICES AS NECESSARY.
- RELOCATE EXISTING DATA CONDUITS STUBBED FROM FINISHED FLOOR TO APPROXIMATELY THIS LOCATION. CONDUITS SHOWN IN THIS AREA ARE NOT INTENDED TO REPRESENT EXACT QUANTITY; CONTRACTOR SHALL COORDINATE EXACT QUANTITY AND LOCATION WITH OTHER DIVISIONS OF THIS CONTRACT, OWNER AND FIELD CONDITIONS PRIOR TO PRICING. PULL EXISTING DATA CABLES AS NECESSARY TO ACCOMMODATE RELOCATION AND PROVIDE MATERIALS AND LABOR NECESSARY TO REPAIR OR REPLACE CABLES OR EQUIPMENT DAMAGED DURING CONSTRUCTION WITH NO CHANGE TO THE CONTRACT AMOUNT OR TIME SCHEDULE.
- JUNCTION BOX MOUNTED ABOVE CEILING.
- MOUNT JUNCTION BOX AT 18" AFF WITH 1-1/2" C. STUBBED TO ABOVE CEILING. PROVIDE COVERPLATE IF OWNER HAS NOT FURNISHED CONNECTION TYPE BY SUBSTANTIAL COMPLETION.
- PROVIDE 14" MINIMUM WIDTH CABLE TRAY ABOVE CEILING WITH 1" CONDUIT BONDED TO TRAY AND EXTENDED TO THE WORK AREA OUTLET BOX. COORDINATE EXACT LOCATION AND LENGTH OF TRAYS WITH FIELD CONDITIONS AND UF INFORMATION TECHNOLOGY DEPT PRIOR TO ORDERING.
- PROVIDE 2-POLE 40A RATED TOGGLE SWITCH. COORDINATE EXACT LOCATION AND ELEVATION WITH DIVISION 22 PRIOR TO ROUGH-IN.
- PROVIDE WEATHERPROOF 3-POLE 60A RATED FUSED DISCONNECT SWITCH LISTED FOR WET LOCATIONS AND OUTDOOR EXPOSURE WITH 22KAIC RATING AND 50A FUSE. COORDINATE EXACT LOCATION AND ELEVATION WITH DIVISION 23 PRIOR TO ROUGH-IN.
- RECEPTACLE FOR OWNER FURNISHED TV. COORDINATE EXACT ELEVATION WITH OWNER AND TV SPECIFICATIONS PRIOR TO ROUGH-IN.
- PROVIDE WEATHERPROOF 3-POLE 60A RATED FUSED DISCONNECT SWITCH LISTED FOR WET LOCATIONS AND OUTDOOR EXPOSURE WITH 22KAIC RATING AND 60A FUSE. COORDINATE EXACT LOCATION AND ELEVATION WITH DIVISION 23 PRIOR TO ROUGH-IN.
- 1-1/2" RACEWAY, OR SMALLER (AS LONG AS THE FILL OF THE CONDUIT DOES NOT EXCEED 40%), IN CHASE BETWEEN CASEWORK. COORDINATE EXACT REQUIREMENTS WITH ARCHITECT PRIOR TO PRICING - TYPICAL FOR ALL RACEWAY IN CASEWORK. PROVIDE SHOP DRAWING WITH RACEWAY TYPE.
- OUTLET IN CEILING FOR WIRELESS ACCESS POINT. CONFIRM EXACT LOCATION WITH OWNER, FIELD CONDITIONS AND OTHER DIVISIONS OF THIS CONTRACT PRIOR TO ROUGH-IN.
- RECEPTACLE SHALL COMPLY WITH AUTOMATIC RECEPTACLE AND LIGHTING CONTROL DETAIL ON THIS SHEET.

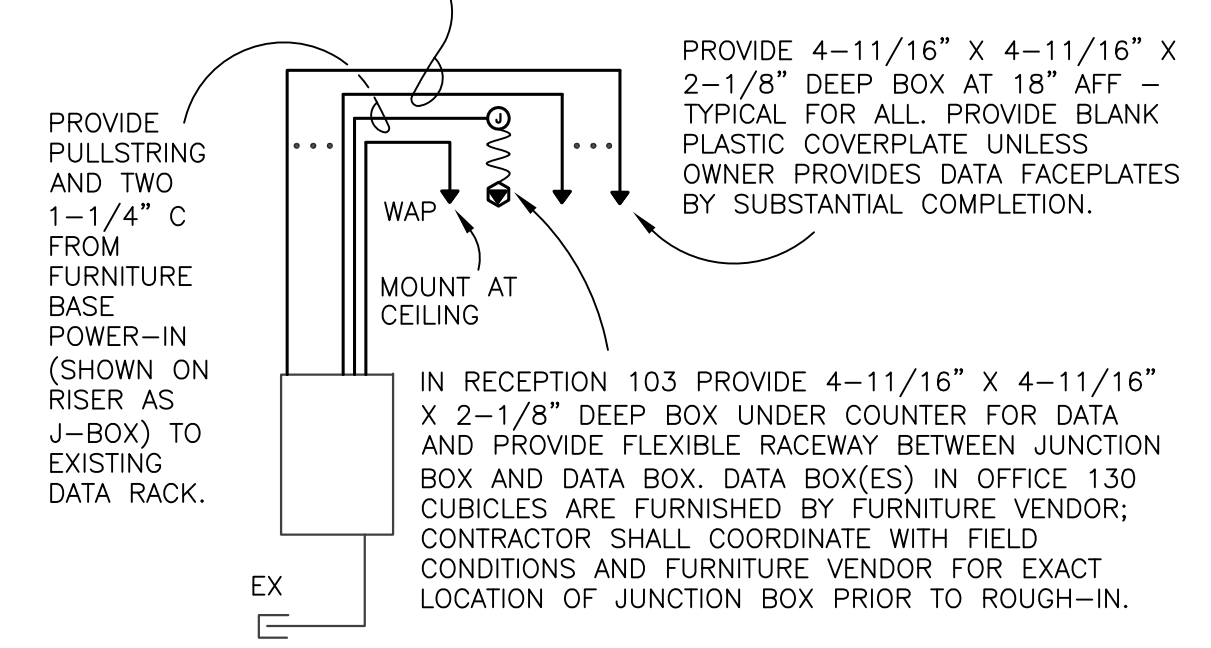
CONTRACTOR SHALL COORDINATE WITH LIGHTING CONTROL PROGRAMMING SCHEDULE ON SHEET E202 PRIOR TO PRICING.



AUTOMATIC RECEPTACLE AND LIGHTING CONTROL DETAIL
NOT TO SCALE

RISER DIAGRAMS ON THIS SHEET SHOW THE GENERAL CONFIGURATION OF THE SYSTEMS. SEE APPROPRIATE DRAWINGS AND/OR MANUFACTURER INSTRUCTIONS FOR EXACT DEVICE, QUANTITIES AND LOCATIONS.

PROVIDE PULLSTRING AND 1" C FROM OUTLETS TO EXISTING DATA RACK. CONDUITS SHALL ONLY BE ROUTED IN NORTH, SOUTH, EAST AND WEST DIRECTIONS; CONDUITS SHALL NOT BE ROUTED DIAGONALLY THROUGH CEILING SPACES. CABLE TRAY AND J-HOOKS MAY BE UTILIZED INSTEAD OF CONDUIT, IF PRACTICAL, ONLY IN CONCEALED CEILING SPACES. COORDINATE EXACT REQUIREMENTS, ELEVATIONS, AND LOCATIONS OF ALL ITEMS (INCLUDING POWER RECEPTACLES) IN TELECOMMUNICATIONS ROOM WITH OWNER AND FIELD CONDITIONS PRIOR TO ROUGH-IN.



TELECOMMUNICATIONS PARTIAL RISER DIAGRAM
NOT TO SCALE

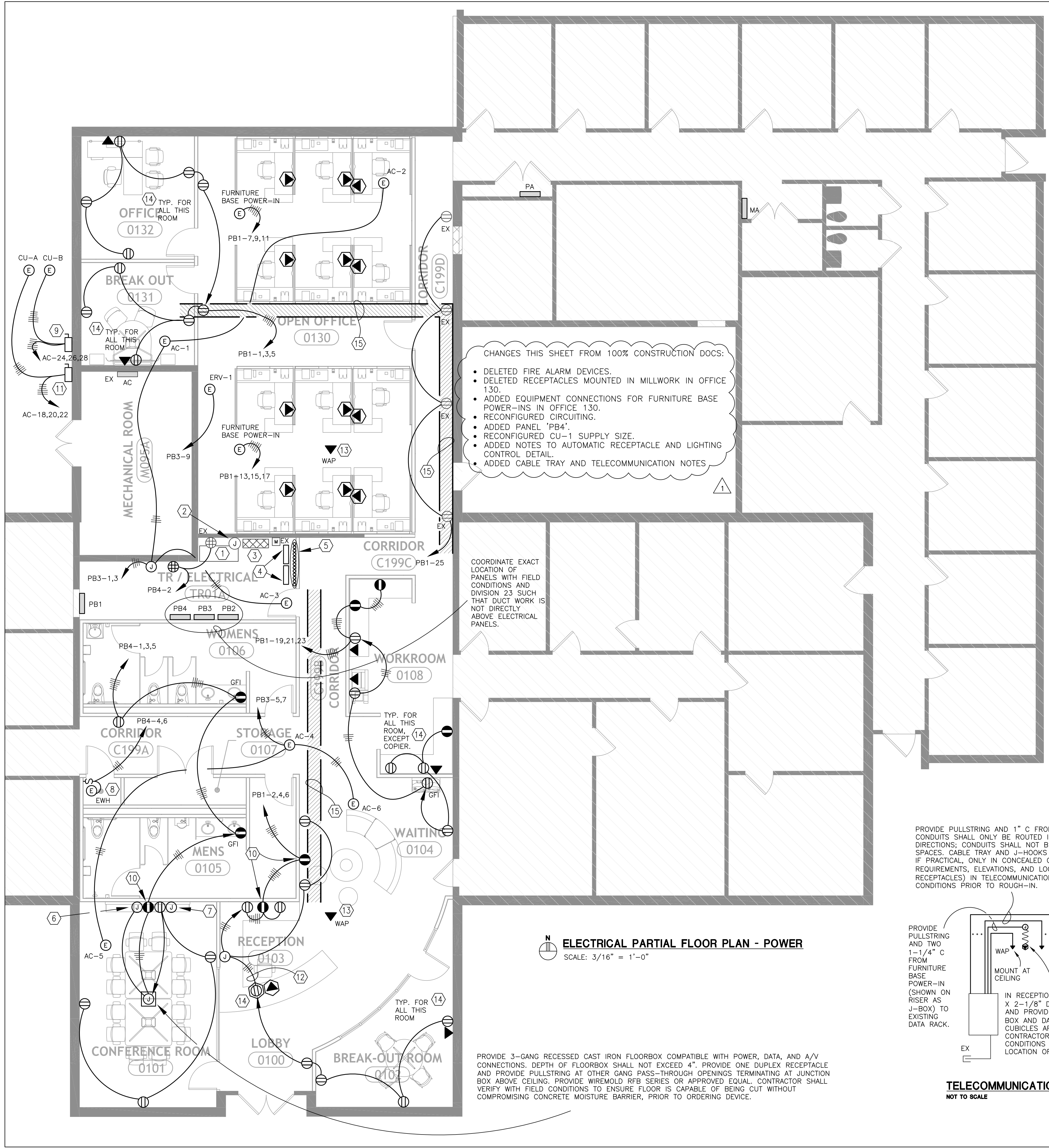
CHANGES THIS SHEET FROM 100% CONSTRUCTION DOCS:

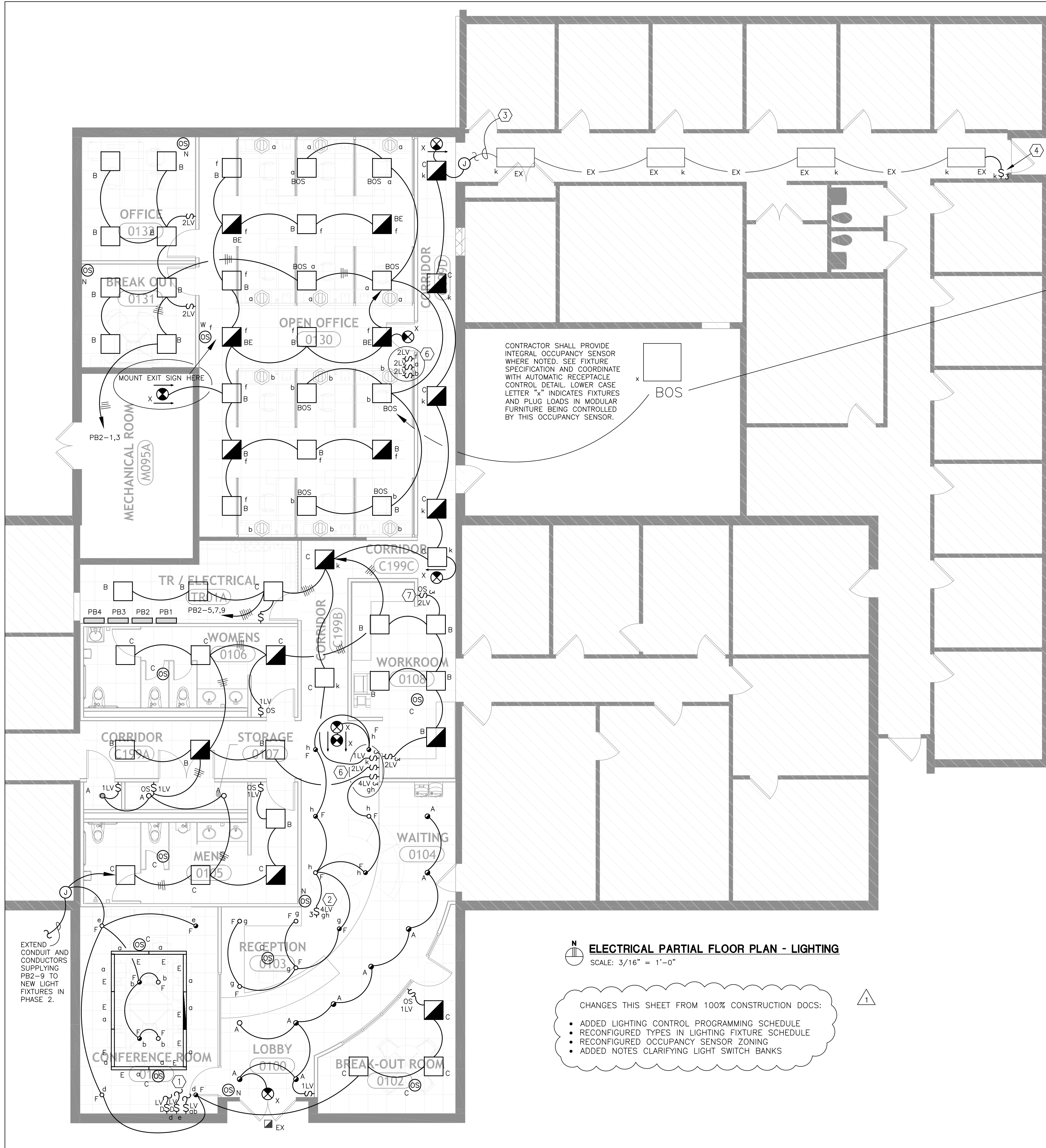
- DELETED FIRE ALARM DEVICES.
- DELETED RECEPTACLES MOUNTED IN MILLWORK IN OFFICE 130.
- ADDED EQUIPMENT CONNECTIONS FOR FURNITURE BASE POWER-INS IN OFFICE 130.
- RECONFIGURED CIRCUITING.
- ADDED PANEL 'PB4'.
- RECONFIGURED CU-1 SUPPLY SIZE.
- ADDED NOTES TO AUTOMATIC RECEPTACLE AND LIGHTING CONTROL DETAIL.
- ADDED CABLE TRAY AND TELECOMMUNICATION NOTES.

COORDINATE EXACT LOCATION OF PANELS WITH FIELD CONDITIONS AND DIVISION 23 SUCH THAT DUCT WORK IS NOT DIRECTLY ABOVE ELECTRICAL PANELS.

PROVIDE 3-GANG RECESSED CAST IRON FLOORBOX COMPATIBLE WITH POWER, DATA, AND A/V CONNECTIONS. DEPTH OF FLOORBOX SHALL NOT EXCEED 4". PROVIDE ONE DUPLEX RECEPTACLE AND PROVIDE PULLSTRING AT OTHER GANG PASS-THROUGH OPENINGS TERMINATING AT JUNCTION BOX ABOVE CEILING. PROVIDE WIREMOLD RFB SERIES OR APPROVED EQUAL. CONTRACTOR SHALL VERIFY WITH FIELD CONDITIONS TO ENSURE FLOOR IS CAPABLE OF BEING CUT WITHOUT COMPROMISING CONCRETE MOISTURE BARRIER, PRIOR TO ORDERING DEVICE.

ELECTRICAL PARTIAL FLOOR PLAN - POWER
SCALE: 3/16" = 1'-0"





ELECTRICAL PARTIAL FLOOR PLAN - LIGHTING
SCALE: 3/16" = 1'-0"

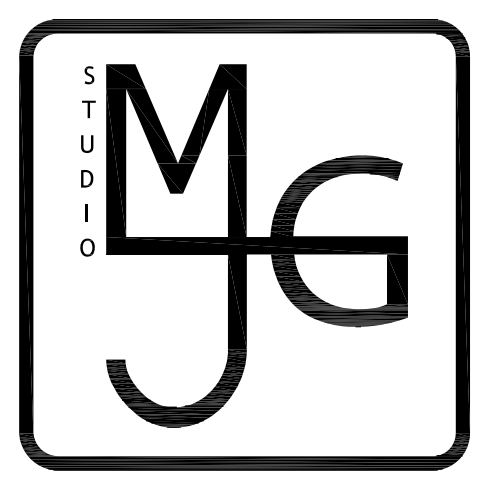
CHANGES THIS SHEET FROM 100% CONSTRUCTION DOCS:

- ADDED LIGHTING CONTROL PROGRAMMING SCHEDULE
- RECONFIGURED TYPES IN LIGHTING FIXTURE SCHEDULE
- RECONFIGURED OCCUPANCY SENSOR ZONING
- ADDED NOTES CLARIFYING LIGHT SWITCH BANKS

LIGHTING FIXTURE SCHEDULE	
TYPE	DESCRIPTION
A	6" RECESSED ROUND LED DOWN LIGHT WITH AT LEAST 18 GAUGE GALVANIZED STEEL HOUSING, SELF FLANGED TRIM WITH CLEAR LOW IRESCENT REFLECTOR (OR AS SELECTED BY ARCHITECT), 1,750 MINIMUM OUTPUT LUMEN, 4000K CCT, MINIMUM 80 CRI, NO LESS THAN 50° BEAM SPREAD, 120V OR UNIVERSAL VOLTAGE, NON-DIMMING DRIVER AND INTEGRAL EMERGENCY BATTERY PACKS AS INDICATED ON DRAWINGS. INTENSE LIGHTING IML6L3409 SERIES, CONTECH RL38SA40KC SERIES, PRESCOLITE MD6LED (WITH BETWEEN .6 AND .3 LUMEN FACTOR) OR FOR MANUFACTURERS NOT LISTED, COMPLY WITH 'REQUEST FOR SUBSTITUTION' SECTION IN ELECTRICAL SPECIFICATIONS BOOK; ONLY PROPOSED FIXTURES SUBMITTED (14) BUSINESS DAYS PRIOR TO PRICING WILL BE REVIEWED.
B	2'X2' RECESSED LED TROFFER FIXTURE WITH DIE FORMED 22-GAUGE COLD ROLLED STEEL, FROSTED ACRYLIC SHIELDING, MINIMUM 2,000 OUTPUT LUMENS, 4000K CCT, NON-GLARE FINISH WITH WHITE COLOR OR AS SELECTED BY ARCHITECT, MOUNTING TYPE AS NECESSARY TO ACCOMMODATE CEILING TYPE SPECIFIED, 120V OR UNIVERSAL VOLTAGE WITH 0-10V DIMMING DRIVER. H.E. WILLIAMS LT-22-L22/840-AF SERIES, PHILLIPS-DAYBRITE FLUXGRID SERIES, COLUMBIA LIGHTING LSER22-40-ED-U SERIES OR FOR MANUFACTURERS NOT LISTED, COMPLY WITH 'REQUEST FOR SUBSTITUTION' SECTION IN ELECTRICAL SPECIFICATIONS BOOK; ONLY PROPOSED FIXTURES SUBMITTED (14) BUSINESS DAYS PRIOR TO PRICING WILL BE REVIEWED.
BE	SHALL BE THE SAME AS TYPE B, EXCEPT WITH INTEGRAL EMERGENCY BACKUP DRIVER.
BOS	SHALL BE THE SAME AS TYPE B, EXCEPT WITH INTEGRAL OCCUPANCY SENSOR. ADD H.E. WILLIAMS OCC OPTION, PHILLIPS DAYOCC SENSOR, OR COLUMBIA OW SENSOR AS APPLICABLE.
C	SHALL BE THE SAME AS TYPE B, EXCEPT WITH 3,500 LUMEN OUTPUT INSTEAD OF 2,000 AND DIMMING DRIVER NOT REQUIRED.
E	4' LONG STAND-ALONE LINEAR RECESSED LED FIXTURE, MOUNTING OPTION AS NECESSARY TO ACCOMMODATE CEILING TYPE SPECIFIED, 1,700 LUMEN OUTPUT PER 4', WITH 4000K CCT, DIFFUSER STYLE AND COLOR AS SELECTED BY ARCHITECT, UNIVERSAL VOLTAGE, NON-DIMMING DRIVER WITH INTEGRAL EMERGENCY BACKUP AS INDICATED ON DRAWINGS. PHILIPS TRUGROOVE 39S1L SERIES, FINELITE HP-4R-4'-S8-30-F SERIES, METALUMEN CALEDONIA RML1L30K SERIES OR FOR MANUFACTURERS NOT LISTED, COMPLY WITH 'REQUEST FOR SUBSTITUTION' SECTION IN ELECTRICAL SPECIFICATIONS BOOK; ONLY PROPOSED FIXTURES SUBMITTED (14) BUSINESS DAYS PRIOR TO PRICING WILL BE REVIEWED.
F	SHALL BE THE SAME AS TYPE A, EXCEPT WITH 0-10V DIMMING DRIVER AND 1100 OUTPUT LUMEN INSTEAD OF 2,500.
G	2'X4' RECESSED FLUORESCENT STATIC PRISMATIC ACRYLIC LENS FIXTURE WITH MULTI-STAGE PHOSPHATE TREATED HOUSING, 0.125" THICK LENS, DIE-FORMED COLD-ROLLED STEEL FIXTURE, TWO 32 WATT T8 LAMPS, MOUNTING OPTION AS NECESSARY TO ACCOMMODATE CEILING TYPE SPECIFIED, FLAT STEEL WHITE COLORED DOOR WITH MITERED CORNERS, CLASS P HIGH POWER FACTOR ELECTRONIC BALLAST, AND WITH EMERGENCY BATTERY PACK AS INDICATED ON DRAWINGS. PHILLIPS-DAYBRITE T68/ 2T SERIES, OR FOR MANUFACTURERS NOT LISTED, COMPLY WITH 'REQUEST FOR SUBSTITUTION' SECTION IN ELECTRICAL SPECIFICATIONS BOOK; ONLY PROPOSED FIXTURES SUBMITTED (14) BUSINESS DAYS PRIOR TO PRICING WILL BE REVIEWED.
X	WALL OR CEILING MOUNTED LED EXIT SIGN WITH DIE-CAST ALUMINUM HOUSING, A BLACK FINISH, SIGN SHALL HAVE 6" HIGH RED LETTERS ON A BRUSHED ALUMINUM FACEPLATE, PROVIDE SINGLE OR DOUBLE FACE SIGN WITH DIRECTIONAL ARROWS AS INDICATED ON THE DRAWINGS, SOLID STATE AND BATTERY BACKUP. BEGHELLI, CHLORIDE, LEGION LIGHTING OR FOR MANUFACTURERS NOT LISTED, SUBMIT PROPOSED FIXTURES TO THE ENGINEER (14) BUSINESS DAYS PRIOR TO BID DATE FOR REVIEW.

LIGHTING CONTROL PROGRAMMING	
PROGRAMMING NOTES	ZONE CONTROLLED & DESIGNATION
1 100% OUTPUT AUTO-ON	RM. 130 LETTER "f" 1 4 6
2 100% OUTPUT MANUAL-ON	RM. 130 LETTER "a" 1 4 6
3 50% OUTPUT AUTO-ON	RM. 130 LETTER "b" 1 4 6
4 BI-LVL 50% MANUAL-ON	BREAKOUT RM. 131 2 4 6
5 BI-LVL 30% MANUAL-ON	OFFICE 132 2 4 6
6 100% OUTPUT AUTO-OFF 20 MINUTE TIME DELAY	MENS 1 6
7 100% OUTPUT MANUAL-OFF	WOMENS 1 6
8 MANUAL DIMMING	STORAGE RM. 107 1 6
	TR/ELECTRICAL ROOM TR01A 2 7
	ALL CORRIDORS 2 7
	WATER HEATER CLOSET 2 7
	WORKROOM 108 1 4 6
	BREAKOUT RM. 102 2 4 6
	CONF. RM. 101 LETTER "a" 1 6
	CONF. RM. 101 LETTER "b" 2 6
	CONF. RM. 101 LETTER "d" 2 6 8
	CONF. RM. 101 LETTER "e" 2 6 8
	RECEPTION 103 LETTER "g" 2 4 6
	LOBBY/WAITING RM. 1 6
	WAITING RM. LETTER "h" 1 4 6

- KEY NOTES:**
- SWITCHES TO CONTROL DESIGNATED LIGHTING FIXTURES.
 - SWITCHES TO CONTROL DESIGNATED LIGHTING FIXTURES. MOUNT SWITCHES ON WALL AND PROVIDE MATERIALS AND LABOR NECESSARY SUCH THAT FIXTURES CAN BE AT 100% OUTPUT AND 50% OUTPUT.
 - PROVIDE MATERIALS AND LABOR NECESSARY TO INTERCEPT EXISTING LIGHTING CONDUIT AND CONDUCTORS IN EXISTING CORRIDOR. PROVIDE NO LESS THAN A 2-RELAY ROOM CONTROLLER AND INSTALL SUCH THAT EXISTING AND NEW FIXTURES IN CORRIDORS ARE CONTROLLED BY SAME SWITCHES AS NOTED ON DRAWINGS.
 - COORDINATE THE REUSE OF EXISTING LIGHT SWITCH AT APPROXIMATELY THIS LOCATION WITH FIELD CONDITIONS PRIOR TO PRICING. CONTRACTOR SHALL PROVIDE ADDITIONAL MATERIALS NECESSARY IF EXISTING LIGHT SWITCH IS DEEMED NOT PRACTICAL FOR REUSE.
 - SEE LIGHTING CONTROL PROGRAMMING.
 - PROVIDE 3-GANG BOX FOR LIGHT SWITCHES. LIGHT SWITCH(ES) WITH TWO BUTTONS CONTROL FIXTURES AT 100% OUTPUT AND 50% OUTPUT.
 - PROVIDE 2-GANG BOX FOR LIGHT SWITCHES. LIGHT SWITCH(ES) WITH TWO BUTTONS CONTROL FIXTURES AT 100% OUTPUT AND 50% OUTPUT. PROVIDE 1/2" C STUBBED TO ABOVE CEILING FROM EMPTY GANG OPENING AND PROVIDE BLANK COVERPLATE.



STUDIO MJG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - PHASE 1
RENOVATION**

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE
1	FIELD ORDER NO. 1	8/18/2017

PROJECT NUMBER: 17032
ISSUE DATE: 18 AUGUST 2017
CREATED BY: JSA
CHECKED BY: TWS

E202
ELECTRICAL
LIGHTING FLOOR
PLAN & FIXTURE
SCHEDULE

**CAMPBELL
SPELICY
ENGINEERING**

3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpelicy.com
Certificate of Authorization: 00008813

PROJECT: 17032 FIELD ORDER NO.1



STUDIO MJG, LLC
5211 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

PNL - PB1 100A MLO SCR : 22 KAIC PPD BLDG 700											
120/208V-3PH 4W		CKT BKR	PHASE LOAD AMP						CKT BKR	SURFACE MNTD	
CKT	LOAD	P/TRIP	A	B	C	X	P/TRIP	LOAD	CKT		
1	RM. 131 RCPT	1/20	7.5	6.0				R	1/20	RM. 104 RCPT 2	
3	RM. 132 RCPT	1/20		6.0	6.0			R	1/20	RM. 103 RCPT 4	
5	RM. 130 RCPT	1/20			4.5	6.0		X	1/20	RM. 102 RCPT 6	
7	RM. 130 RCPT	1/20	6.0	0.0				R	1/20	SPARE - PHASE 3 8	
9	RM. 130 RCPT	1/20			4.5	0.0		R	1/20	SPARE - PHASE 3 10	
11	RM. 130 RCPT	1/20			4.5	0.0		R	1/20	SPARE - PHASE 3 12	
13	RM. 130 RCPT	1/20	6.0	0.0				R	1/20	SPARE - PHASE 3 14	
15	RM. 130 RCPT	1/20			6.0	0.0		R	1/20	SPARE - PHASE 3 16	
17	RM. 130 RCPT	1/20			6.0	0.0		R	1/20	SPARE - PHASE 3 18	
19	RM. 108 RCPT	1/20	4.5	0.0						SPACE 20	
21	COPIER RM. 108	1/20		12.0	0.0					SPACE 22	
23	RM. 108 RCPT	1/20			6.0	0.0				SPACE 24	
25	CORR. 199D RCPT	1/20	6.0	0.0						SPACE 26	
27	SPACE			0.0	0.0					SPACE 28	
29	SPACE				0.0	0.0				SPACE 30	
31	SPACE		0.0	0.0						SPACE 32	
33	SPACE			0.0	0.0					SPACE 34	
35	SPACE				0.0	0.0				SPACE 36	
37			0.0	0.0						SPACE 38	
39	TVSS	3/30		0.0	0.0					SPACE 40	
41					0.0	0.0				SPACE 42	

NOTES:

36.0	35.0	27.0
------	------	------

 AMP
* AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS
CONNECTED: 32.7
DEMAND: 30.3

PNL - PB2 60A MLO SCR : 22 KAIC PPD BLDG 700											
120/208V-3PH 4W		CKT BKR	PHASE LOAD AMP						CKT BKR	SURFACE MNTD	
CKT	LOAD	P/TRIP	A	B	C	X	P/TRIP	LOAD	CKT		
1	RM. 130, 131, 132 LTG	1/20	3.5	0.0				L	1/20	SPARE 2	
3	GENERAL LTG RM 130	1/20		3.0	0.0			L	1/20	SPARE 4	
5	TR01A/HALLWAY LTG	1/20			2.5	0.0		L	1/20	SPARE 6	
7	RM. 108/RESTROOM LTG	1/20	4.0	0.0				L	1/20	SPARE 8	
9	CONF. 101 LTG	1/20		4.0	0.0			L	1/20	SPARE 10	
11	EX. LTG	1/20			9.0	0.0		L	1/20	SPARE 12	
13	EX. LTG	1/20	9.0	0.0				L	1/20	SPARE 14	
15	EX. LTG	1/20			9.0	0.0		L	1/20	SPARE 16	
17	EX. LTG	1/20			9.0	0.0		L	1/20	SPARE 18	
19	SPACE		0.0	0.0					3/30	TVSS 20	
21	SPACE			0.0	0.0					22	
23										24	
25										26	
27										28	
29										30	
31										32	
33										34	
35										36	
37										38	
39										40	
41										42	

NOTES:

17.0	16.0	21.0
------	------	------

 AMP
* AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS
CONNECTED: 18.0
DEMAND: 22.1

PNL - PB3 60A MLO SCR : 22 KAIC PPD BLDG 700											
120/208V-3PH 4W		CKT BKR	PHASE LOAD AMP						CKT BKR	SURFACE MNTD	
CKT	LOAD	P/TRIP	A	B	C	X	P/TRIP	LOAD	CKT		
1	AC-1, AC-2, AC-3	2/20	10.0	3.8				M	1/20	WATER COOLER 2	
3				10.0	0.0			M	1/20	SPARE 4	
5	AC-4, AC-5, AC-6	2/20			10.0	0.0		M	1/20	SPARE 6	
7			10.0	0.0				M	1/20	SPARE 8	
9	ERV-1	1/20		3.5	0.0			M	1/20	SPARE 10	
11					0.0	0.0				SPARE 12	
13	SPARE	3/40	0.0	0.0						SPARE 14	
15				0.0	0.0					SPARE 16	
17	SPARE	1/20			0.0	0.0				TVSS 18	
19	SPARE	1/20	0.0	0.0					3/30	TVSS 20	
21	SPARE	1/20		0.0	0.0					22	
23										24	
25										26	
27										28	
29										30	
31										32	
33										34	
35										36	
37										38	
39										40	
41										42	

NOTES:

24.0	14.0	10.0
------	------	------

 AMP
* AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS
CONNECTED: 16.0
DEMAND: 15.8

PNL - PB4 100A MLO SCR : 22 KAIC PPD BLDG 700											
120/208V-3PH 4W		CKT BKR	PHASE LOAD AMP						CKT BKR	SURFACE MNTD	
CKT	LOAD	P/TRIP	A	B	C	X	P/TRIP	LOAD	CKT		
1	RSTRMS RCPT	1/20	4.5	12.0				R	1/20	ELEC. TR01A RCPT 2	
3	CONF RM. 101	1/20		6.0	36.0			H	2/40	4	
5	CONF RM. 101	1/20			6.0	36.0		H	2/40	6	
7	SPACE - PHASE 2		0.0	0.0						SPACE 8	
9	SPACE - PHASE 2			0.0	0.0					SPACE 10	
11	SPACE - PHASE 2				0.0	0.0				SPACE 12	
13	SPACE - PHASE 2		0.0	0.0						SPACE 14	
15	SPACE - PHASE 2			0.0	0.0					SPACE 16	
17	SPACE - PHASE 2				0.0	0.0				SPACE 18	
19	SPACE - PHASE 2		0.0	0.0						SPACE 20	
21	SPACE - PHASE 2			0.0	0.0					SPACE 22	
23	SPACE - PHASE 2				0.0	0.0				SPACE 24	
25	SPACE - PHASE 2		0.0	0.0						SPACE 26	
27	SPACE - PHASE 2			0.0	0.0					SPACE 28	
29	SPACE - PHASE 2				0.0	0.0				SPACE 30	
31	SPACE - PHASE 2		0.0	0.0						SPACE 32	
33	SPACE - PHASE 2			0.0	0.0					SPACE 34	
35	SPACE - PHASE 2				0.0	0.0				SPACE 36	
37	SPACE - PHASE 2		0.0	0.0						SPACE 38	
39	SPACE - PHASE 2			0.0	0.0				3/30	TVSS 40	
41	SPACE - PHASE 2				0.0	0.0				42	

NOTES:

17.0	42.0	42.0
------	------	------

 AMP
* AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS
CONNECTED: 33.7
DEMAND: 53.4

EX. PNL - AC 200A MCB SCR : 22 KAIC PPD BLDG 700											
120/208V-3PH 4W		CKT BKR	PHASE LOAD AMP						CKT BKR	SURFACE MNTD	
CKT	LOAD	P/TRIP	A	B	C	X	P/TRIP	LOAD	CKT		
1			0.0	0.0				M		2	
3	HVAC UNIT AHU-1	40/3		0.0	0.0			M	3/70	HVAC UNIT OD-1A 4	
5					0.0	0.0		M		6	
7	BOILER INDUCER	1/20	0.0	0.0				M		8	
9	HHW CIRC. PUMP	1/20		0.0	0.0			M	3/70	HVAC UNIT OD-1B 10	
11	EXHAUST FAN	1/20			0.0	0.0		M		12	
13	HVAC CONTROLS	1/20	0.0	0.0				M	2/40	14	
15				0.0	0.0			M		16	
17	AIR COMPRESS.	3/20			0.0	0.0		M		18	
19			0.0	0.0				M	3/40	20	
21	SPARE	1/20		0.0	0.0			M		22	
23	SPARE	1/20			0.0	0.0				24	
25	SPACE		0.0	0.0						26	
27	SPACE			0.0	0.0					28	
29	SPACE				0.0	0.0				30	
31										32	
33										34	
35										36	
37										38	
39										40	
41										42	

NOTES:

*76	*76	*76
-----	-----	-----

 AMP
* AS CALCULATED USING PANEL DIRECTORIES AND AS-BUILT DRAWINGS
CONNECTED: 76.0
DEMAND: 76.0
[N1] PROVIDE NEW BREAKER

MPO2649 BUILDING 700 - PHASE 1 RENOVATION

University of Florida, 2001
McCarty Dr., Gainesville, FL 32611

FIELD ORDER NO. 1

TIMOTHY W. SMITH
PE - 64454

No.	DESCRIPTION	DATE
1	FIELD ORDER NO. 1	8/18/2017

PROJECT NUMBER: 17032
ISSUE DATE: 18 AUGUST 2017
CREATED BY: JSA
CHECKED BY: TWS

E301

ELECTRICAL PANEL SCHEDULES & LOAD CALC.

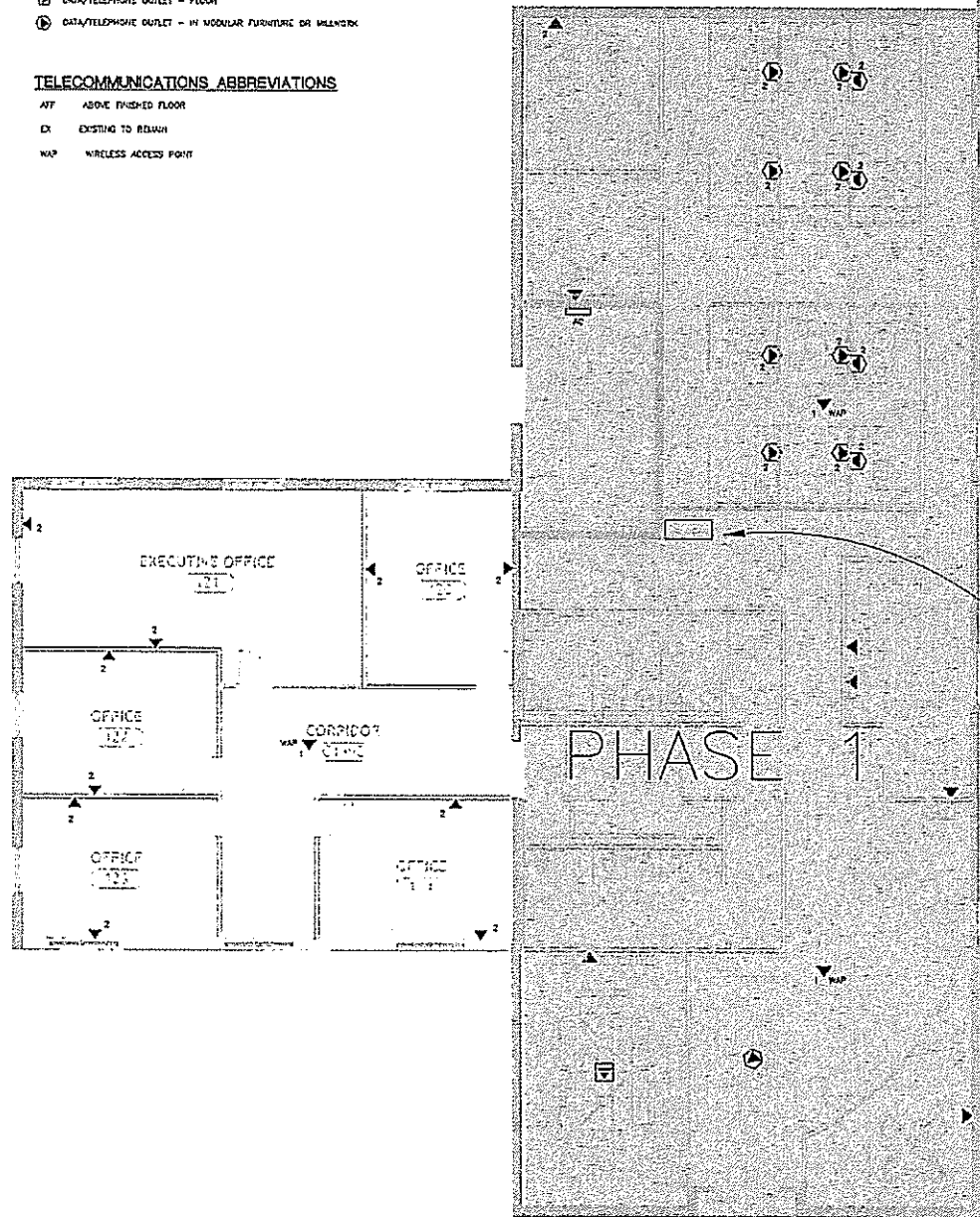
3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813
PROJECT: 17032 FIELD ORDER NO.1

TELECOMMUNICATIONS LEGEND

- K DATA/TELEPHONE OUTLET - WALL
- DATA/TELEPHONE OUTLET - FLOOR
- ⊙ DATA/TELEPHONE OUTLET - IN MODULAR FURNITURE OR MILENOR

TELECOMMUNICATIONS ABBREVIATIONS

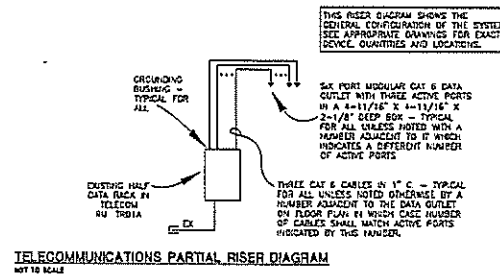
- AF ABOVE FINISHED FLOOR
- EX EXISTING TO REMAIN
- WAP WIRELESS ACCESS POINT



TELECOMMUNICATIONS PARTIAL TELECOMMUNICATIONS FLOOR PLAN
SCALE: 3/16" = 1'-0"

ALL TELECOMMUNICATIONS WORK SHALL COMPLY WITH CATEGORY 6 STANDARDS AND WITH UF CONSTRUCTION STANDARDS REGARDING TELECOMMUNICATIONS.

EXISTING HALF DATA RACK. ONLY TWO SPARE PORTS WERE OBSERVED PRIOR TO DEMOLITION WORK. VERIFY EXACT COUNT.



PROJECT: 17032

3700 HWY 4 by Street, Suite 105
Gainesville, Florida 32606
Phone: 352-372-2597 Fax: 352-372-7222
www.CampbellSpellicy.com
Certificate of Authorization: 00059143

100% CONSTRUCTION DOCUMENTS



STUDIO M&G, LLC
1511 SW 91ST TERRACE, SUITE F
GAINESVILLE, FLORIDA 32606
WWW.STUDIOMAG.COM

MP02649 BUILDING 700 - PHASE 2

RENOVATION
University of Florida, 2001
McCarthy Dr., Gainesville, FL 32611

100% CONSTRUCTION DOCUMENTS

TIMOTHY W. SMITH
PE - 64454

NO.	DESCRIPTION	DATE

PROJECT NUMBER: 17032
DATE: 8/18/2017
CREATED BY:
CHECKED BY:

T101
TELECOMM FLOOR PLAN, LEGEND, & RISER



5206 SW 91st Terrace, Suite A
Gainesville, FL 32608
352.226.8061
www.studiomjg.com

DATE: January 19, 2018
FIELD ORDER NO: TWO (2)
TO:
PROJECT: MP02649 Bldg 700 Renovation
OWNER: University of Florida
Project Manager: Joe Garcia
STUDIO MJG, llc. No: 17031

You are hereby directed to execute promptly this Field Order, which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

DESCRIPTION: This field order addresses existing conditions revealed after demolition and owner requested changes to include new furred-out wall locations, black-out exterior window and fill-in, additional wall finish alignments and Open Office soffit dimension modifications.

- F2-1. DRAWINGS: Sheet A111– ARCHITECTURAL RENOVATION FLOOR PLAN & REFLECTED CEILING PLAN:** Replace sheet A111 in its entirety with the attached sheet A111, dated January 19, 2018.
- F2-2. DRAWINGS: Sheet A610– ARCHITECTURAL INTERIOR PARTITION TYPES:** Replace sheet A610 in its entirety with the attached sheet A610, dated January 19, 2018.
- F2-3. DRAWINGS: Sheet A611– ARCHITECTURAL INTERIOR PARTITION TYPES:** Add sheet A611 dated January 19, 2018 in its entirety to the existing drawing set.

Sincerely,

Michael J. Gilfilen,
President
Studio MJG, llc



STUDIO M J G, LLC
5206 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - INTERIOR
RENOVATION**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

CONFORMANCE
DOCUMENTS

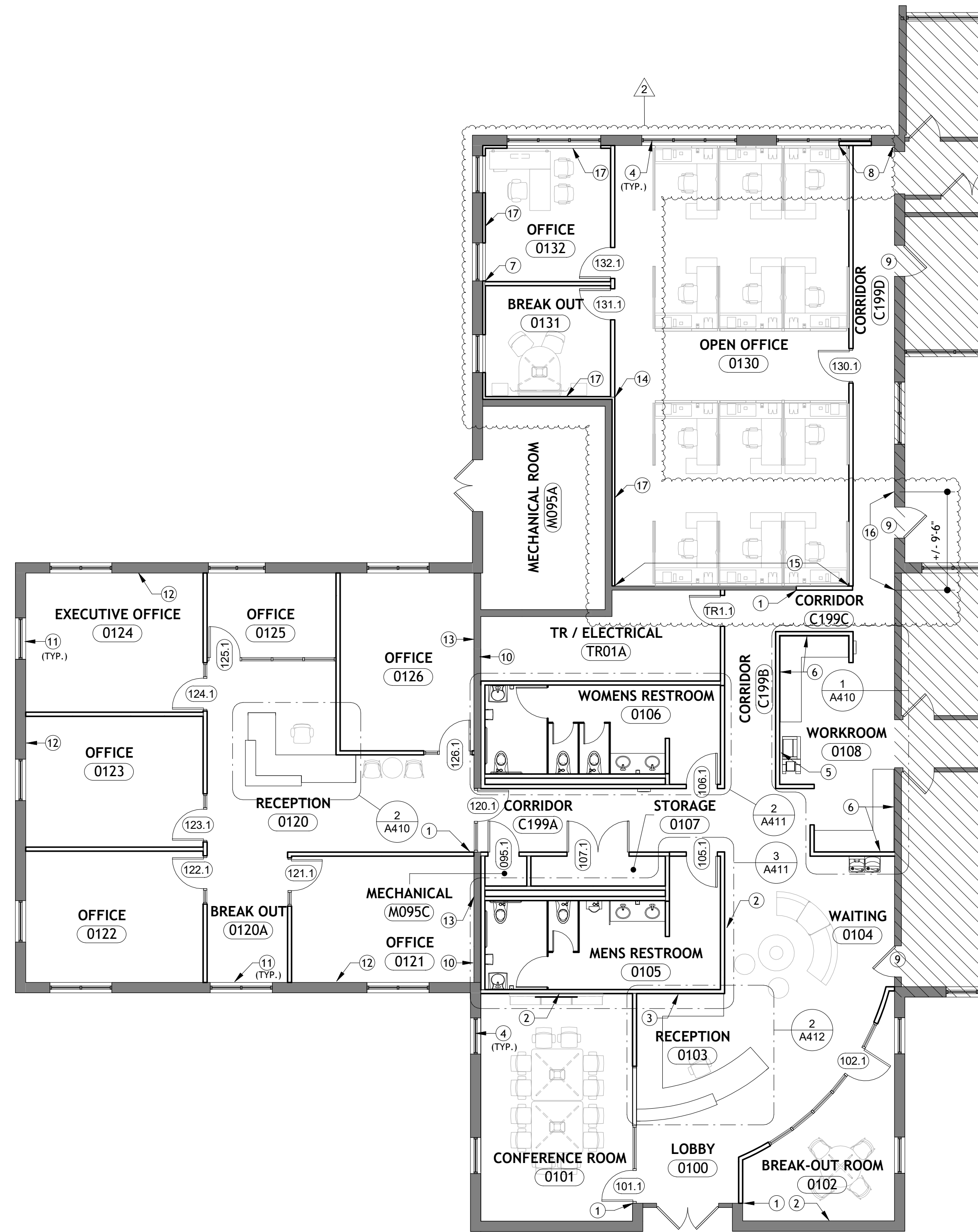
Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE
2	FO 02	1/19/2018

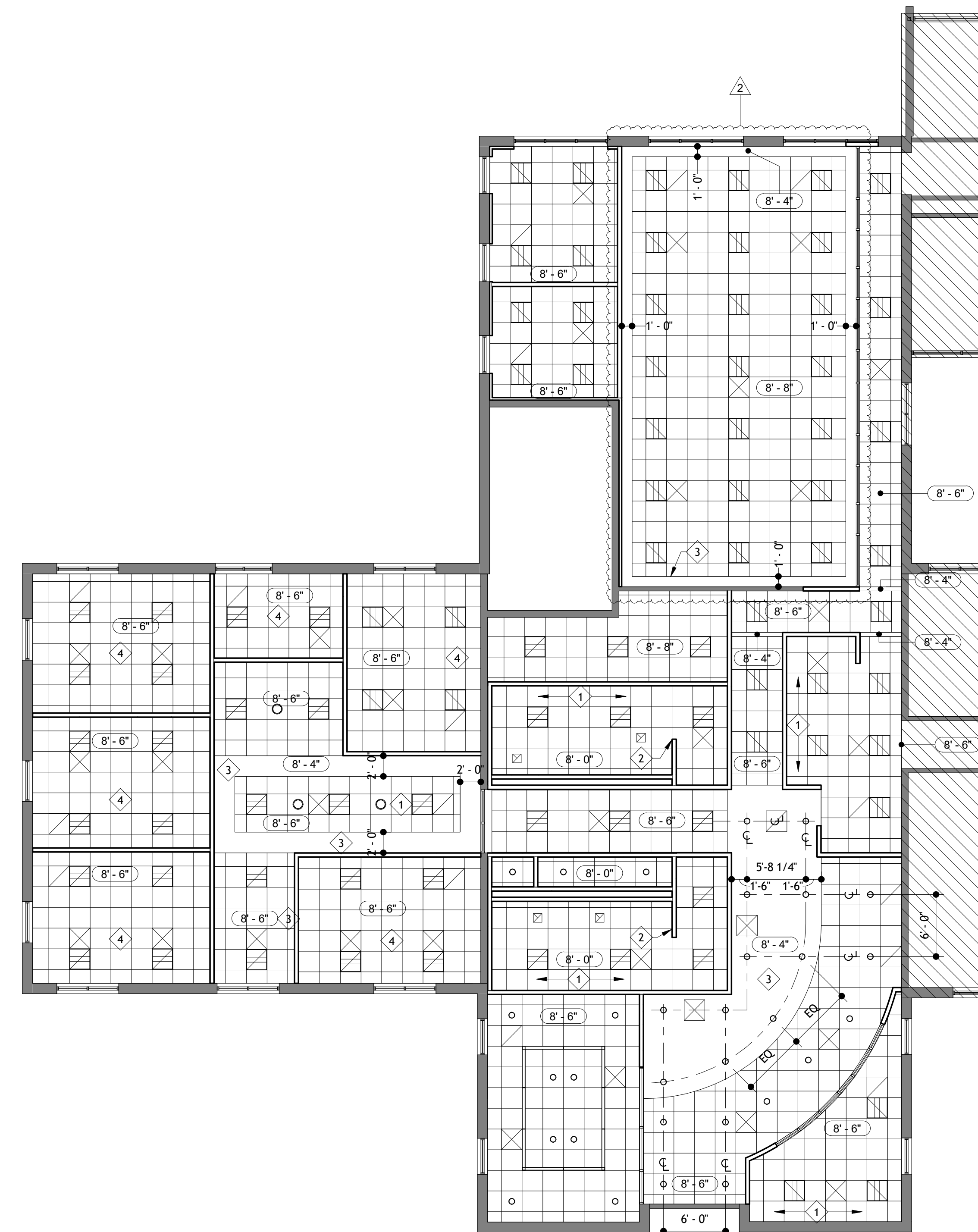
PROJECT NUMBER: 17016
ISSUE DATE: 1 NOVEMBER 2017
CREATED BY: MAR
CHECKED BY: MJG

A111
ARCHITECTURAL
RENOVATION FLOOR
PLAN & REFLECTED
CEILING PLAN

1/19/2018 9:45:59 AM



1 ARCHITECTURAL RENOVATION FLOOR PLAN
1/8" = 1'-0"



2 ARCHITECTURAL RENOVATION REFLECTED CEILING PLAN
1/8" = 1'-0"

- RENOVATION NOTES**
- ALIGN FINISHED FACE OF NEW GWB PARTITION TO FINISH FLUSH WITH EXISTING ADJACENT FINISH
 - PROVIDE POWER AND DATA AT THIS LOCATION FOR WALL MOUNTED DISPLAY (SEE ELECTRICAL)
 - PROVIDE 6" BRUSHED ALUMINUM LETTERS AND BLOCKING AT THIS LOCATION FOR SUITE SIGNAGE
 - INSTALL ROLLER SHADES AT ALL EXTERIOR OPENINGS (TYP.)
 - PROVIDE DEDICATED CIRCUIT AND DATA FOR COPIER
 - INSTALL BLOCKING AS REQUIRED FOR UPPER CABINETS
 - ALIGN FINISHED FACE OF NEW GWB PARTITION WITH EXISTING FINISHED FACE OF WINDOW JAMB
 - PROVIDE GWB PARTITION RETURN TO CENTER LINE OF EXISTING MULLION, BLACK-OUT EXISTING GLAZING WITH 3M WINDOW TINT, PROVIDE A LEVEL 5 FINISH CORNER TO CORNER
 - SAND, PRIME AND PAINT EXISTING DOOR FRAMES
 - INFILL EXISTING WALL OPENING, WITH METAL STUD FRAMING AND 5/8" GWB, ALIGN NEW GWB WITH EXISTING ADJACENT SURFACE, PROVIDE A UNIFORM LEVEL 5 FINISH CORNER TO CORNER
 - INSTALL NEW SOLID SURFACE WINDOW SILLS
 - PATCH AND REPAIR ALL EXISTING EXTERIOR WALL SURFACES AS REQUIRED TO PROVIDE A UNIFORM LEVEL 5 FINISH PRIOR TO PAINT (TYP.)
 - PATCH AND REPAIR ALL EXISTING INTERIOR WALL SURFACES AS REQUIRED TO PROVIDE A UNIFORM LEVEL 5 FINISH PRIOR TO PAINT (TYP.)
 - ALIGN NEW 3 5/8" METAL STUD FRAMING WITH NEW 2 1/2" FURRING - INSTALL 5/8" GWB TO PROVIDE A FLAT UNIFORM LEVEL 4 FINISH
 - PROVIDE TWO (2) LAYERS OF 5/8" GWB AT THIS LOCATION TO MATCH EXISTING ADJACENT SURFACE, PROVIDE A UNIFORM LEVEL 5 FINISH CORNER TO CORNER
 - PROVIDE TWO (2) LAYERS OF 5/8" GWB AT THIS LOCATION, PROVIDE "J" BEAD TERMINATION TO ALIGN WITH NEW HEADER
 - FURR OUT EXISTING WALLS WITH 5/8" GWB ON 2 1/2" METAL STUD FRAMING

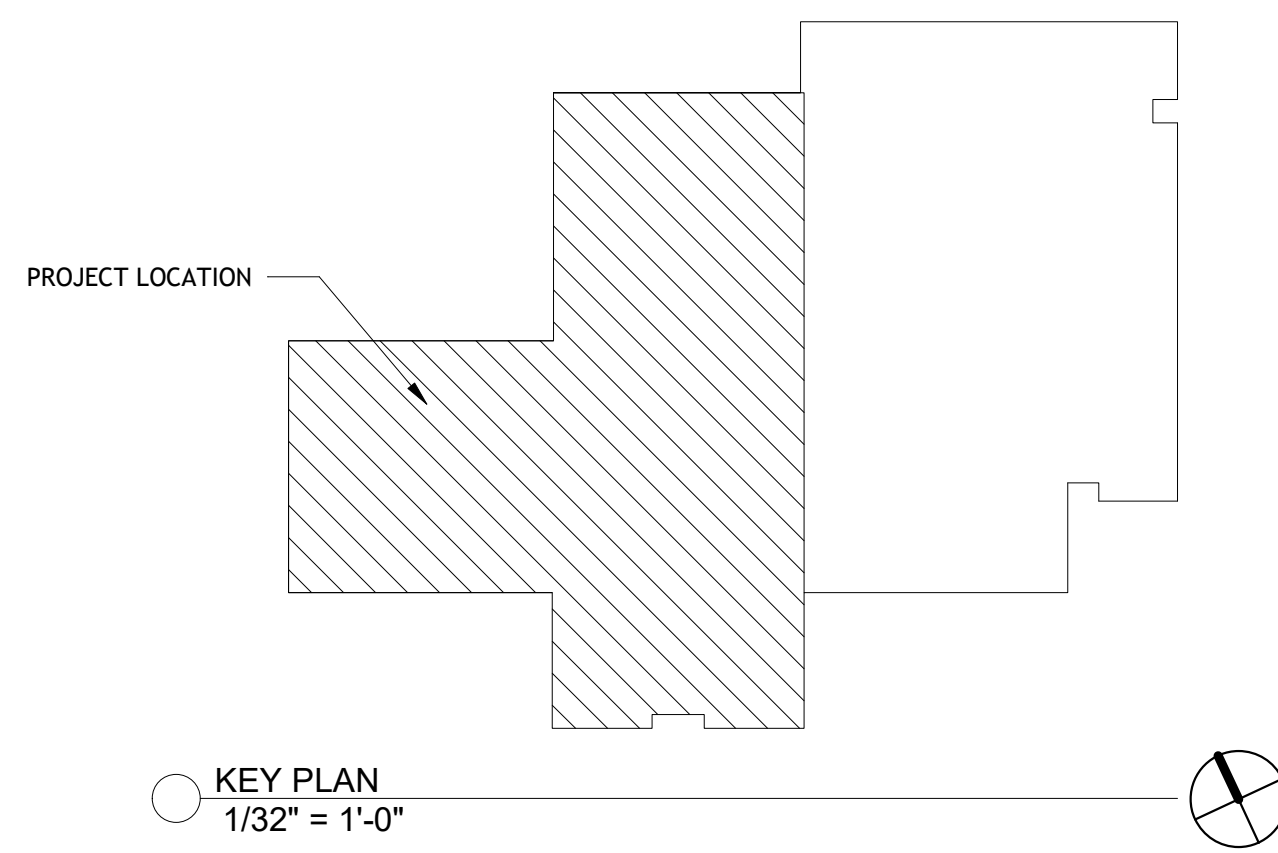
WALL TYPE LEGEND

	EXISTING WALLS
	WALLS TO BE REMOVED
	NEW CONSTRUCTION

- REFLECTED CEILING PLAN NOTES**
- START CEILING GRID WITH FULL TILE AT THIS LOCATION
 - ALIGN CEILING GRID WITH ADJACENT WALL SURFACE
 - PAINT ON 5/8" GWB ON 22 GAUGE METAL STUD FRAMING SOFFIT
 - NEW SUSPENDED CEILING SYSTEM

REFLECTED CEILING PLAN LEGEND

	2X2 CEILING GRID		SUPPLY DIFFUSERS
	2X2 LAY-IN LIGHT FIXTURE (UNLESS NOTED OTHERWISE)		RETURN GRILLE
	RECESSED DOWNLIGHT		EXHAUST FAN
	SKYLIGHT DIFFUSER		EXIT SIGN





STUDIO MJG, LLC
5206 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

MP02649 BUILDING 700 - INTERIOR RENOVATION
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

CONFORMANCE DOCUMENTS

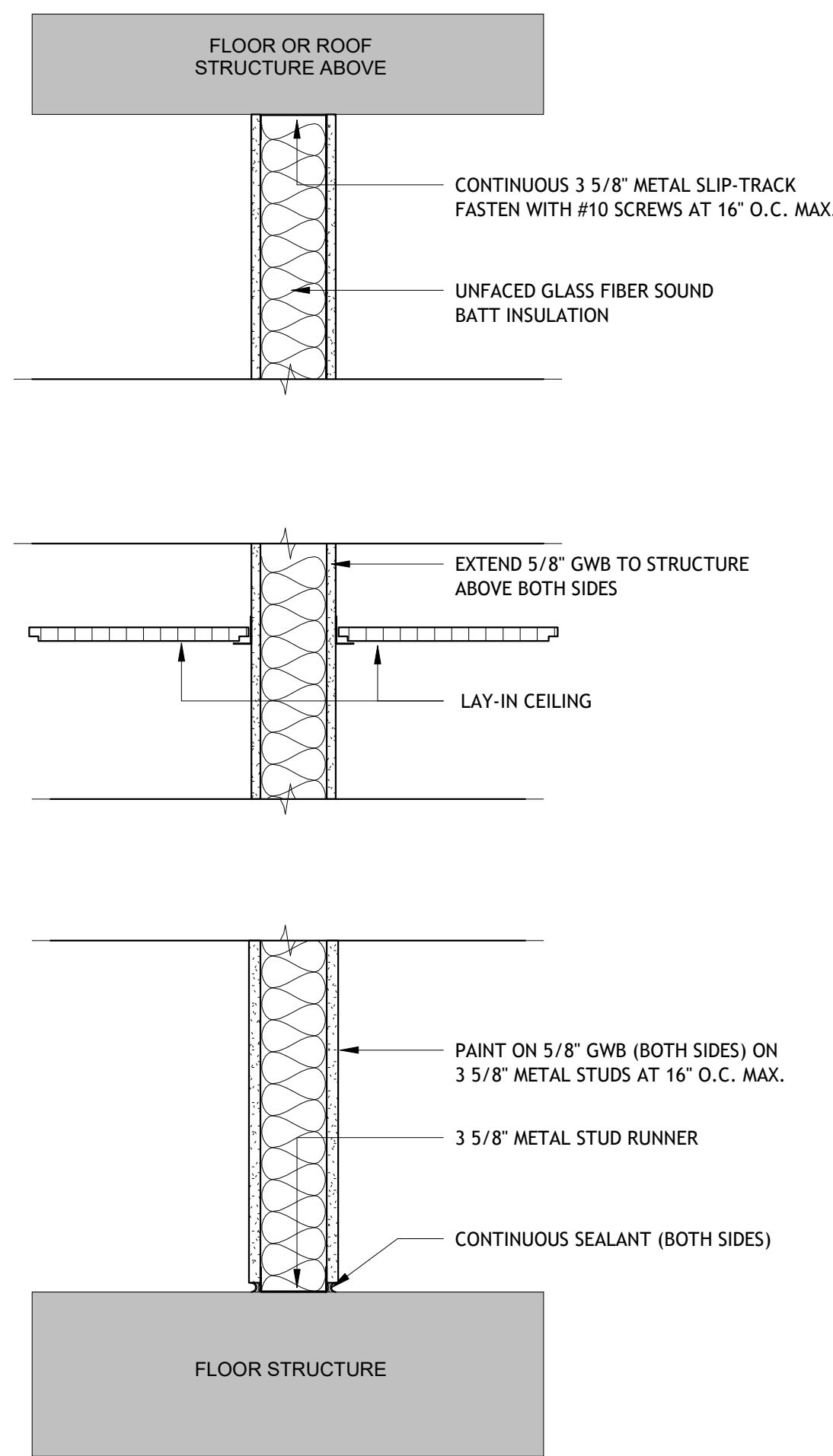
Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE
2	FO 02	1/19/2018

PROJECT NUMBER: 17016
ISSUE DATE: 1 NOVEMBER 2017
CREATED BY: MAR
CHECKED BY: MJG

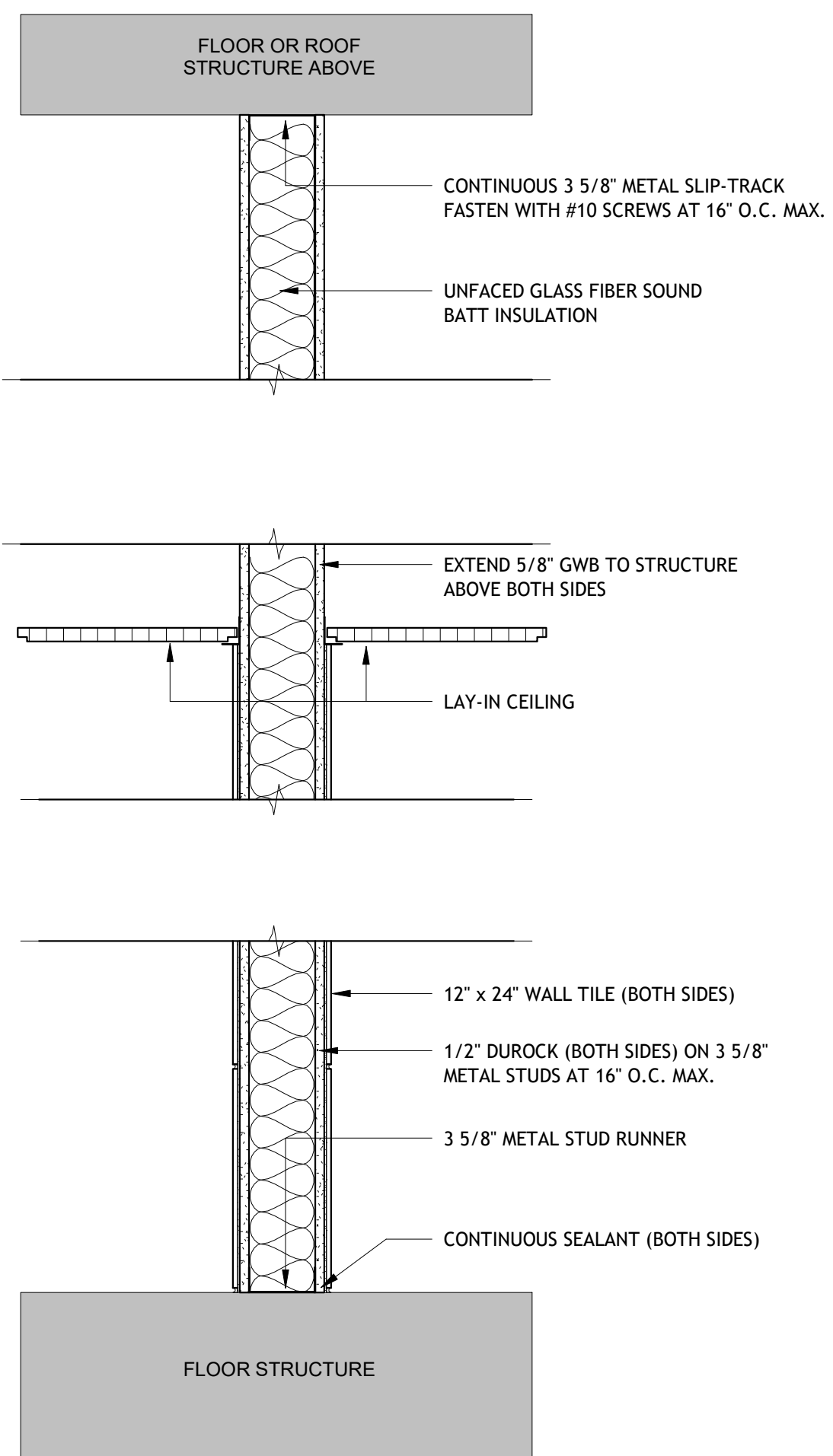
A610
ARCHITECTURAL INTERIOR PARTITION TYPES

1/19/2018 9:45:59 AM



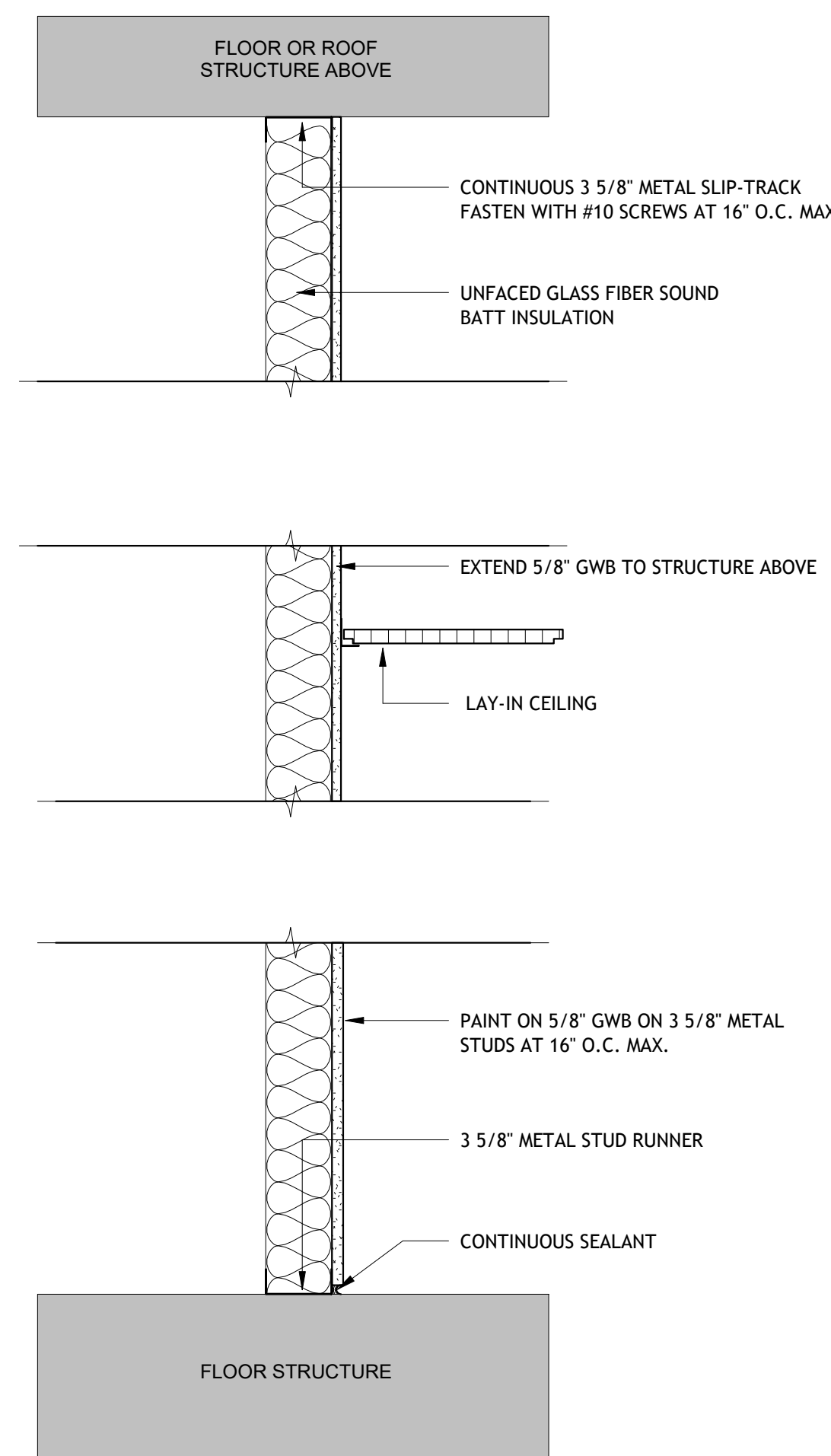
MS01

1 INTERIOR PARTITION TYPE - MS01
1 1/2" = 1'-0"



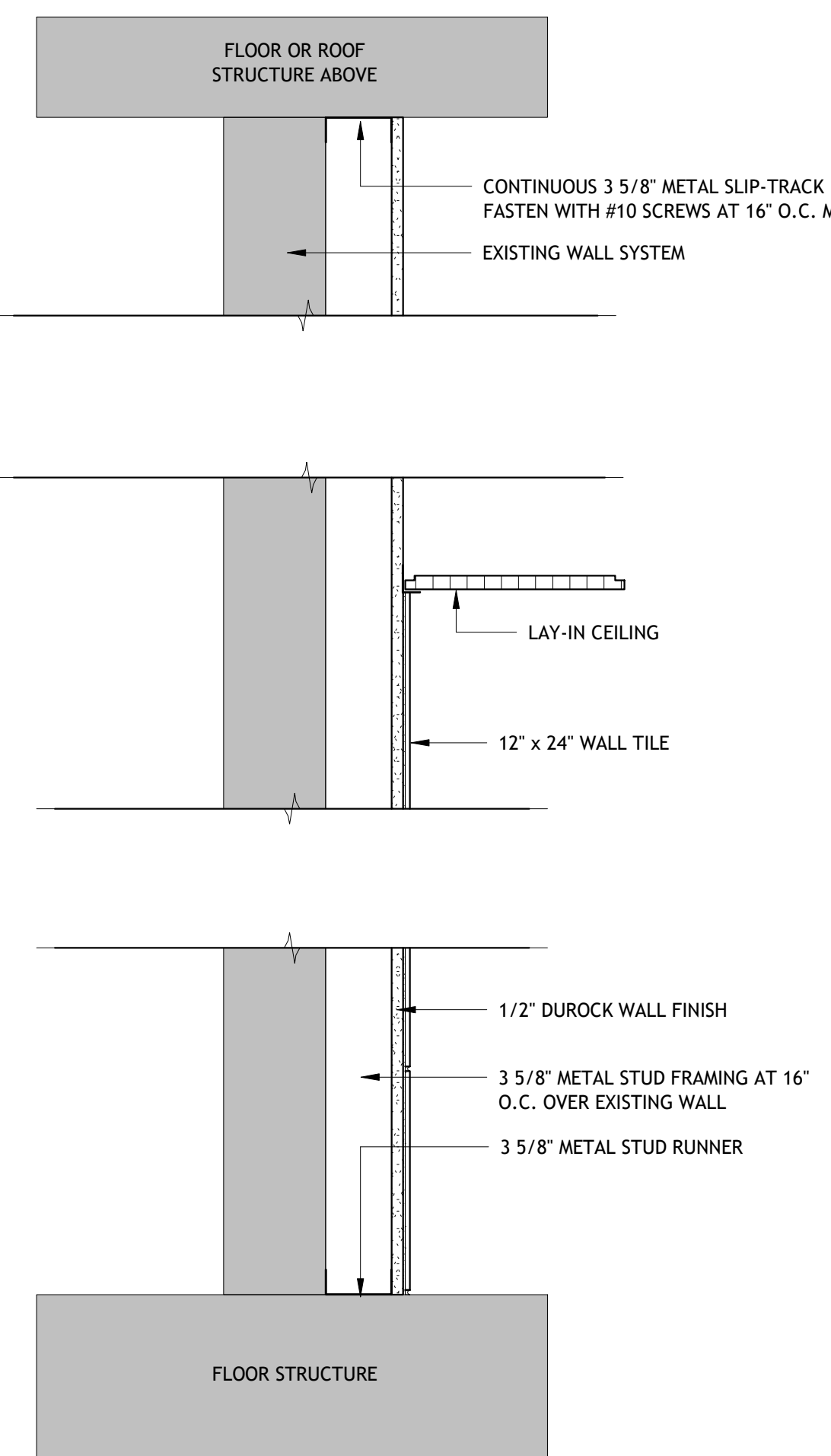
MS05

5 INTERIOR PARTITION TYPE - MS05
1 1/2" = 1'-0"



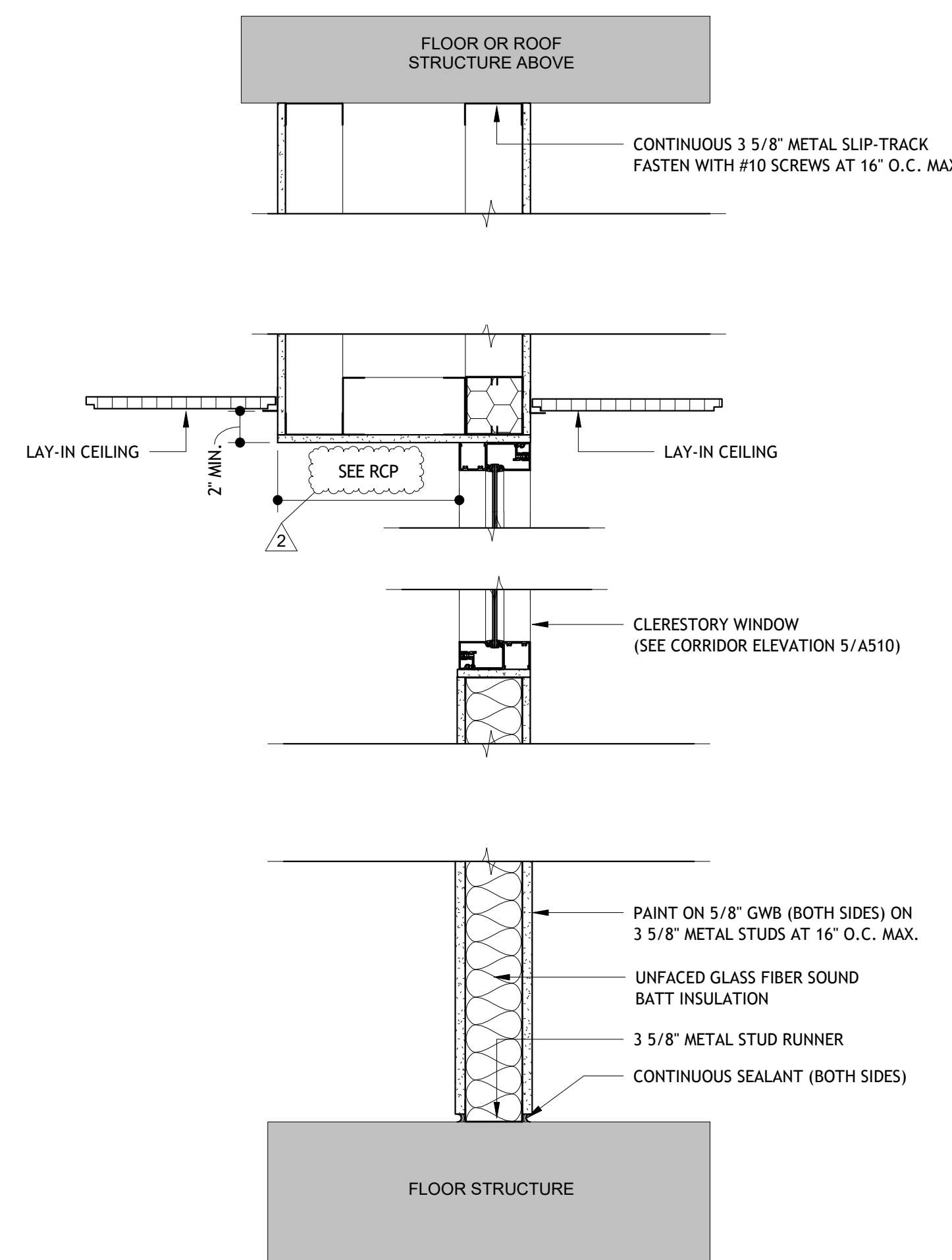
MS02

2 INTERIOR PARTITION TYPE - MS02
1 1/2" = 1'-0"



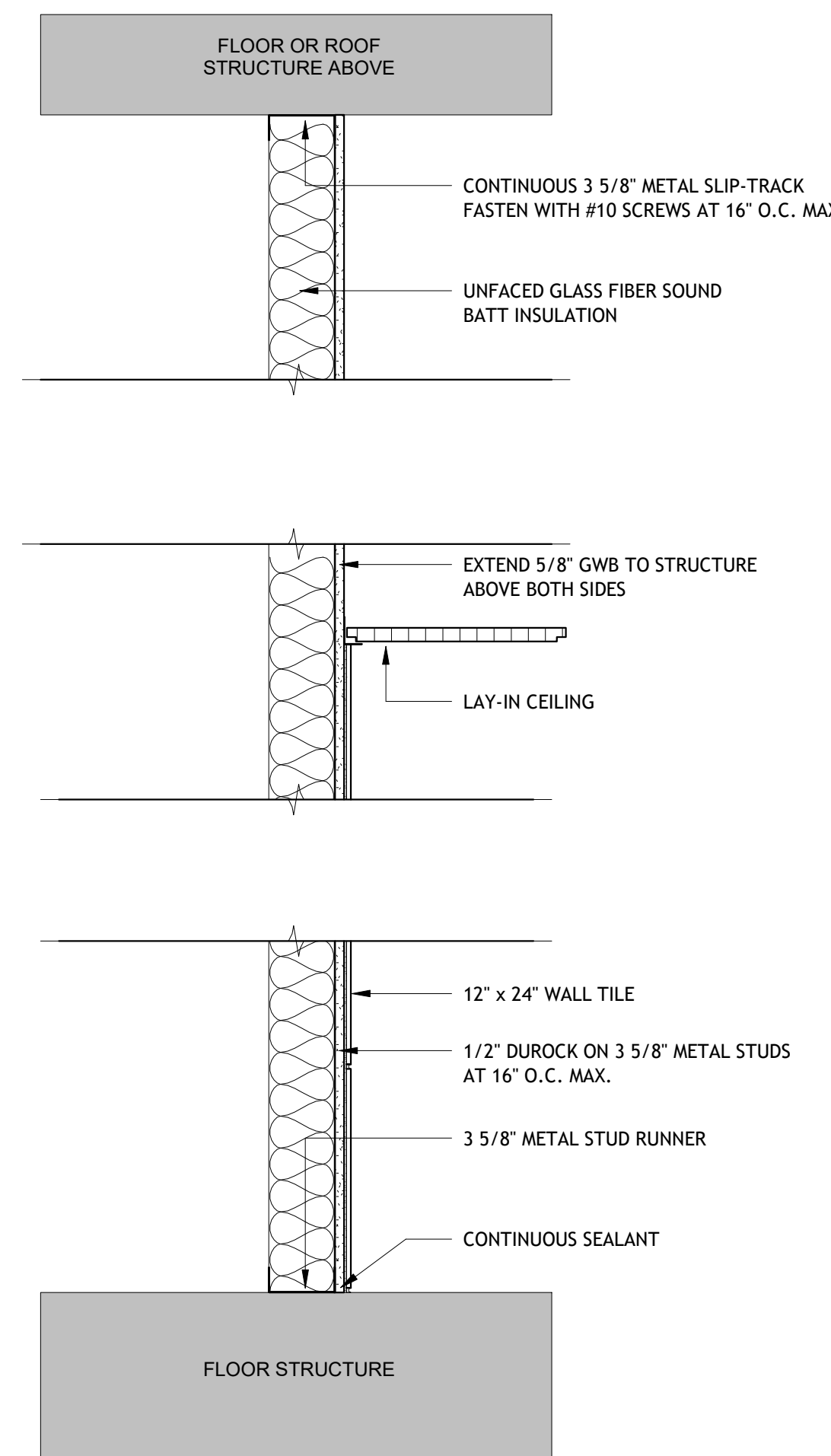
MS06

6 INTERIOR PARTITION TYPE - MS06
1 1/2" = 1'-0"



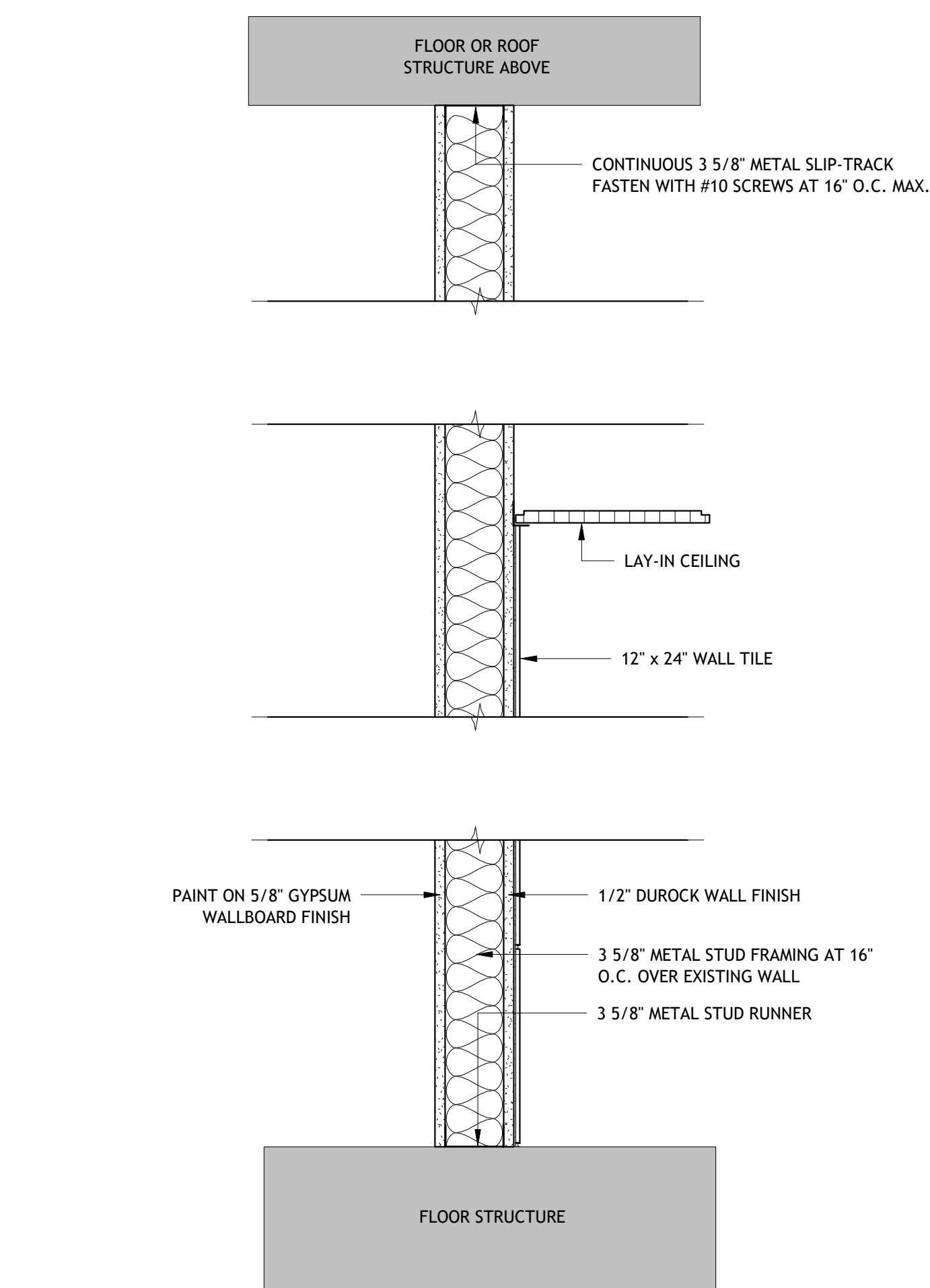
MS03

3 INTERIOR PARTITION TYPE - MS03
1 1/2" = 1'-0"



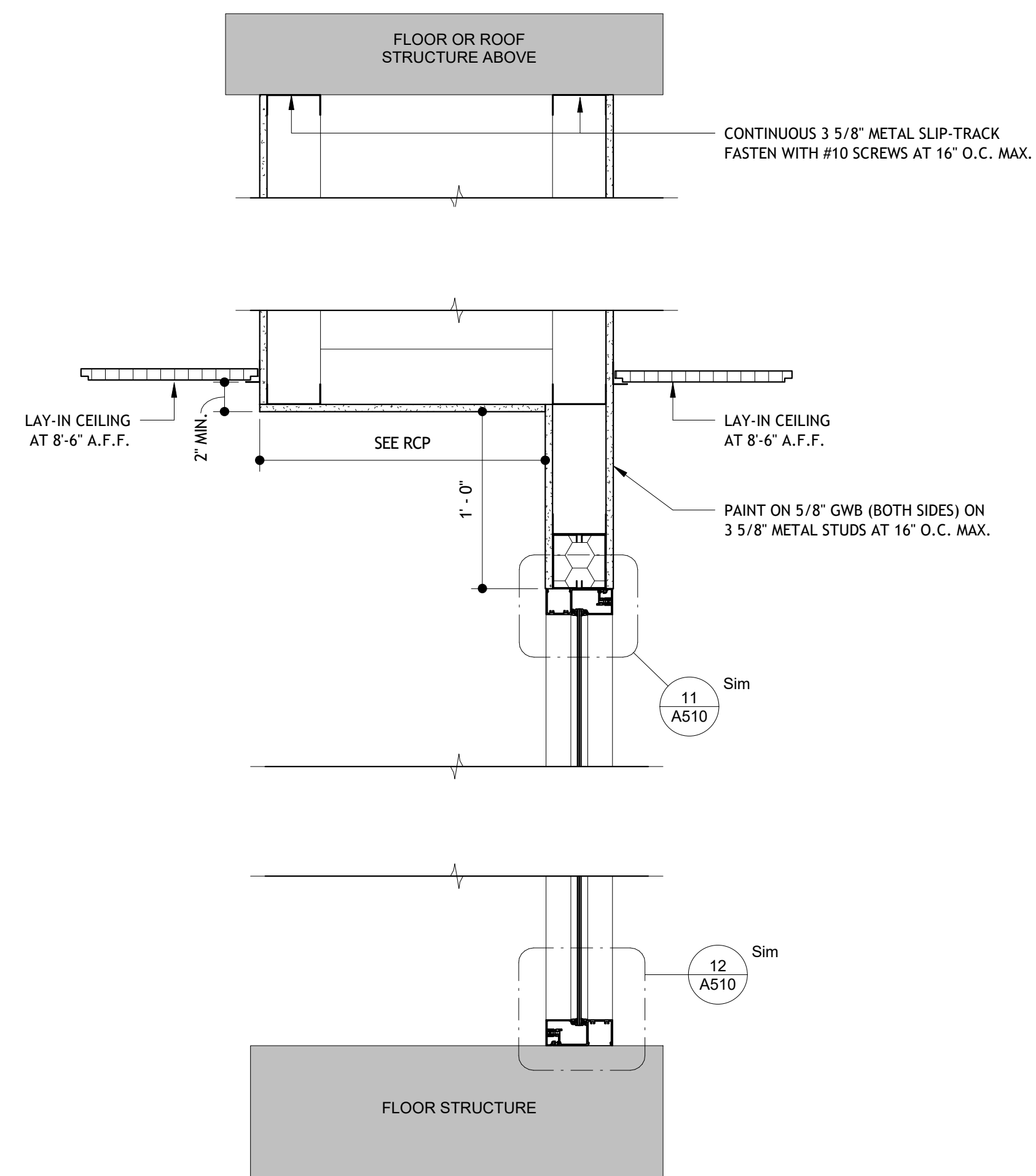
MS07

7 INTERIOR PARTITION TYPE - MS07
1 1/2" = 1'-0"



MS04

4 INTERIOR PARTITION TYPE - MS04
1 1/2" = 1'-0"



MS08

8 INTERIOR PARTITION TYPE - MS08
1 1/2" = 1'-0"



STUDIO MJG, LLC
 5206 SW 91ST TERRACE, SUITE A
 GAINESVILLE, FLORIDA 32608
 WWW.STUDIOMJG.COM

MP02649 BUILDING 700 - INTERIOR RENOVATION
 UNIVERSITY OF FLORIDA 3280 RADIO RD
 GAINESVILLE, FL 32611

CONFORMANCE DOCUMENTS

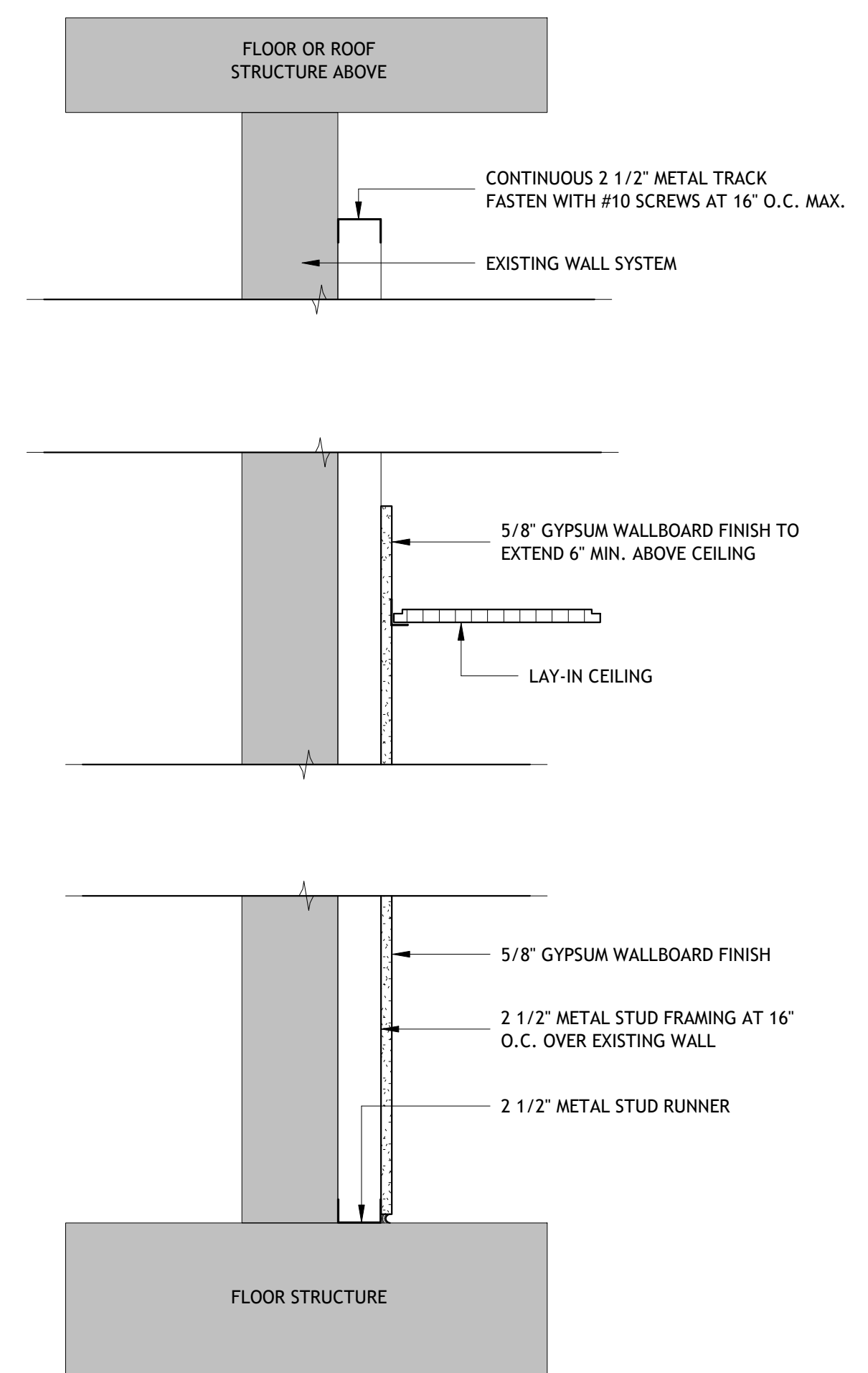
Michael J. Gilfilen
 AR94453

No.	DESCRIPTION	DATE
2	FO 02	1/19/2018

PROJECT NUMBER:	17016
ISSUE DATE:	1 NOVEMBER 2017
CREATED BY:	MAR
CHECKED BY:	MJG

A611
 ARCHITECTURAL INTERIOR PARTITION TYPES

1/19/2018 9:45:59 AM



MS09

① INTERIOR PARTITION TYPE - MS09
 1 1/2" = 1'-0"

②



5206 SW 91st Terrace, Suite A
Gainesville, FL 32608
352.226.8061
www.studiomjg.com

DATE: March 9, 2018
FIELD ORDER NO: THREE (3)
TO:

PROJECT: MP02649 Bldg 700 Renovation
OWNER: University of Florida
Project Manager: Joe Garcia
STUDIO MJG, llc. No: 17031

You are hereby directed to execute promptly this Field Order, which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

DESCRIPTION: This field order addresses owner requested changes to the finish materials, adds an architectural floor finish pattern plan and adds skylight diffuser locations in Open Office 0130.

F3-1. DRAWINGS: Sheet G100- COVER SHEET: Add sheet A100 Architectural Phasing Plan, A114 Architectural Floor Finish Pattern Plan & A611 Architectural Interior Partition Types to the drawing sheet index.

F3-2. DRAWINGS: Sheet A111- ARCHITECTURAL RENOVATION FLOOR PLAN & REFLECTED CEILING PLAN: Replace sheet A111 in its entirety with the attached sheet A111 dated March 9, 2018.

F3-3. DRAWINGS: Sheet A113- ARCHITECTURAL FINISH FLOOR PLAN, SCHEDULE, AND LEGEND: Replace sheet A113 in its entirety with the attached sheet A113 dated March 9, 2018.

F3-4. DRAWINGS: Sheet A114- ARCHITECTURAL FLOOR FINISH PATTERN PLAN: Add the attached sheet A114 dated March 9, 2018 in its entirety to the Conformance Documents drawing set.



5206 SW 91st Terrace, Suite A
Gainesville, FL 32608
352.226.8061
www.studiomjg.com

Sincerely,

Michael J. Gilfilen,
President
Studio MJG, llc



STUDIO M J G, LLC
5206 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

MP02649 BUILDING 700 - INTERIOR RENOVATION
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

CONFORMANCE DOCUMENTS

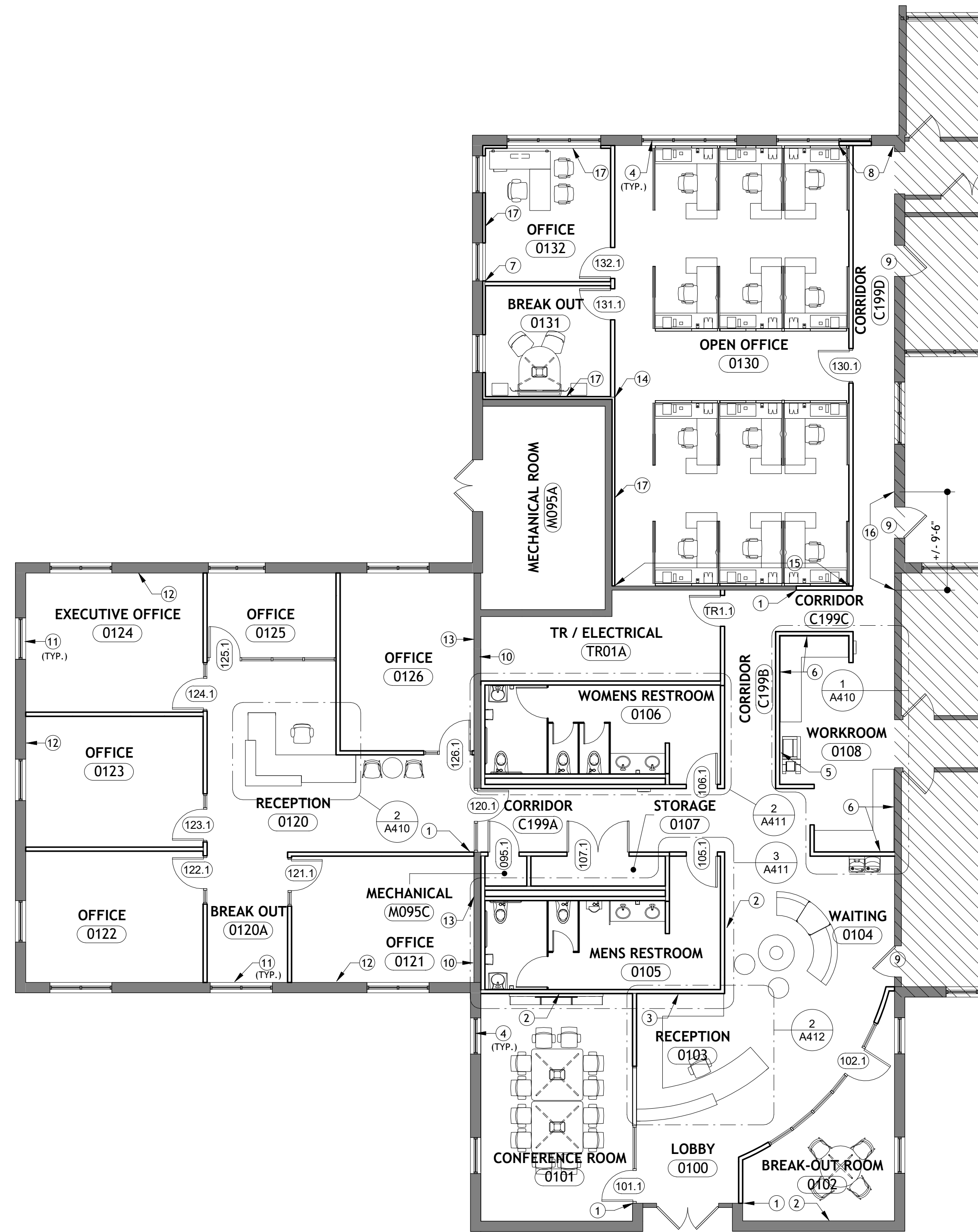
Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE
2	FO 02	1/19/2018
3	FO 03	3/9/2018

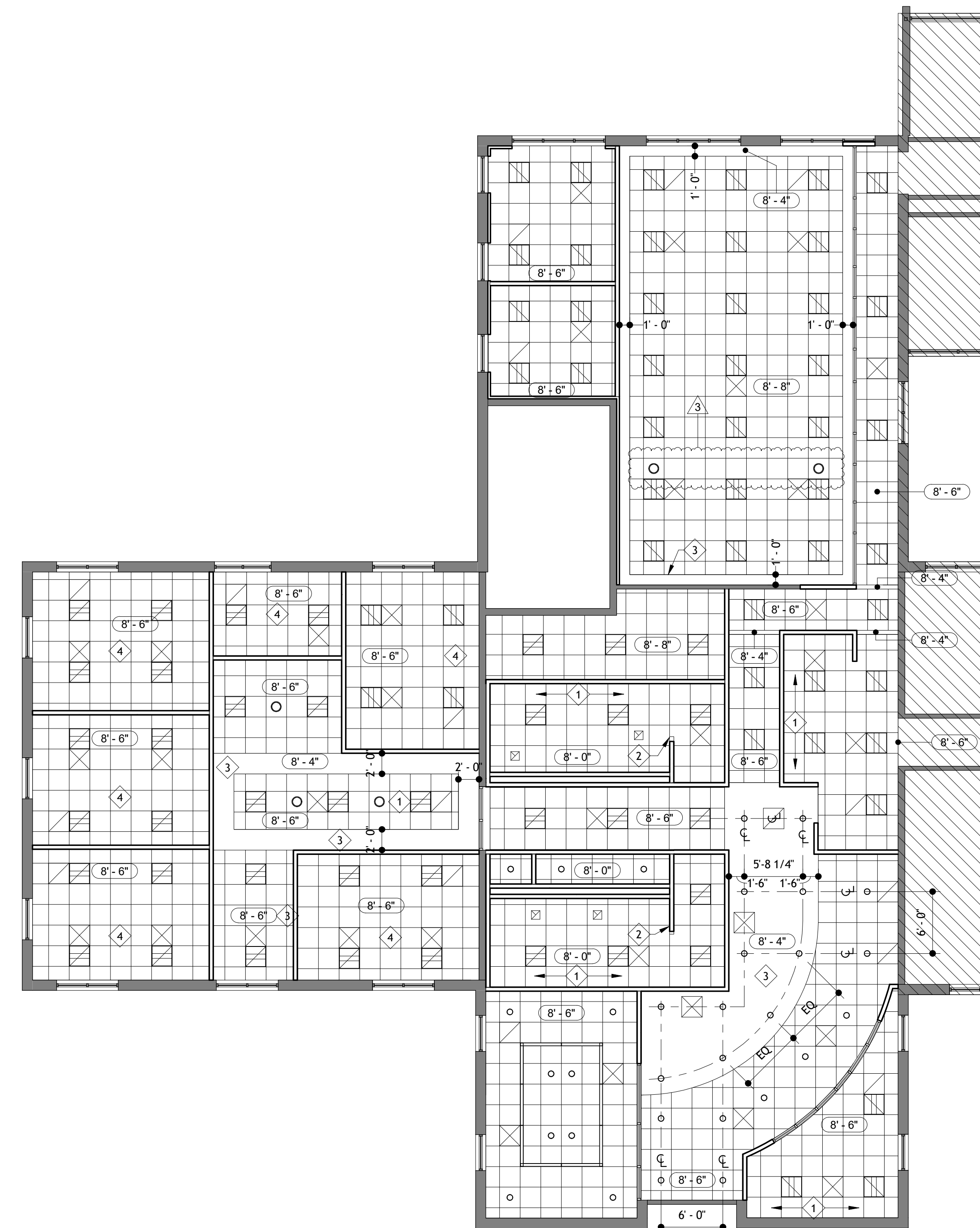
PROJECT NUMBER: 17016
ISSUE DATE: 1 NOVEMBER 2017
CREATED BY: MAR
CHECKED BY: MJG

A111
ARCHITECTURAL RENOVATION FLOOR PLAN & REFLECTED CEILING PLAN

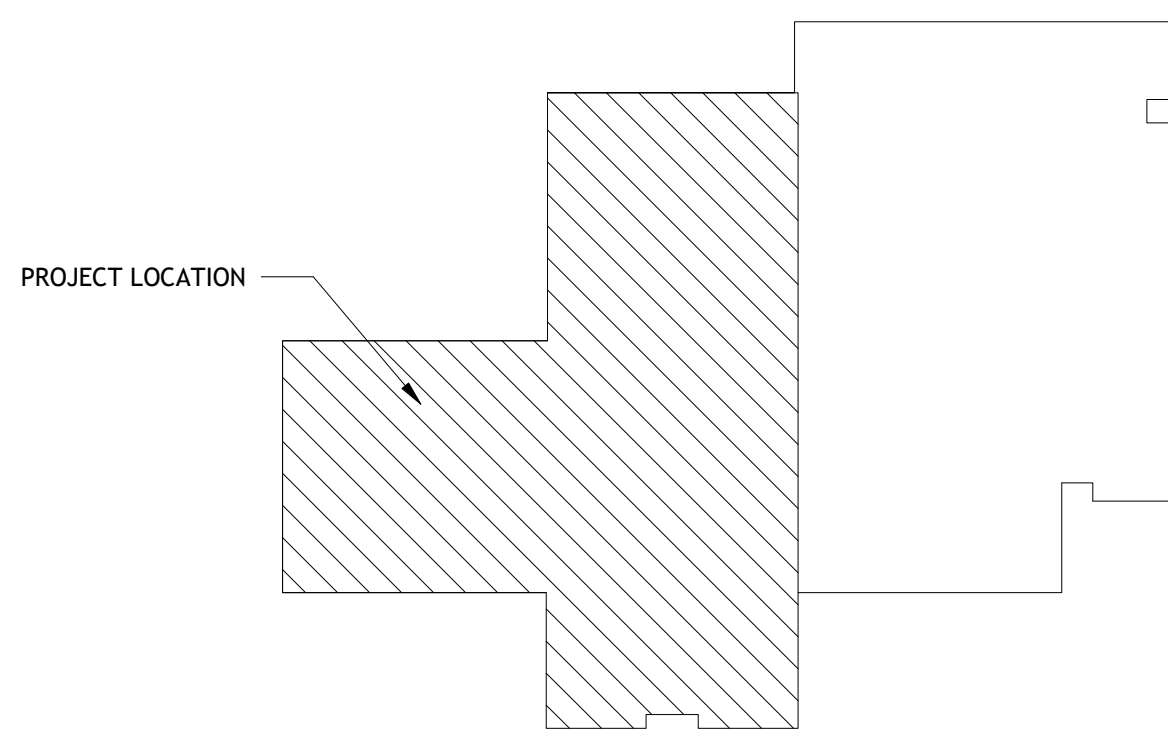
3/9/2018 10:13:13 AM



1 ARCHITECTURAL RENOVATION FLOOR PLAN
1/8" = 1'-0"



2 ARCHITECTURAL RENOVATION REFLECTED CEILING PLAN
1/8" = 1'-0"



KEY PLAN
1/32" = 1'-0"

- ### RENOVATION NOTES
- ALIGN FINISHED FACE OF NEW GWB PARTITION TO FINISH FLUSH WITH EXISTING ADJACENT FINISH
 - PROVIDE POWER AND DATA AT THIS LOCATION FOR WALL MOUNTED DISPLAY (SEE ELECTRICAL)
 - PROVIDE 6" BRUSHED ALUMINUM LETTERS AND BLOCKING AT THIS LOCATION FOR SUITE SIGNAGE
 - INSTALL ROLLER SHADES AT ALL EXTERIOR OPENINGS (TYP.)
 - PROVIDE DEDICATED CIRCUIT AND DATA FOR COPIER
 - INSTALL BLOCKING AS REQUIRED FOR UPPER CABINETS
 - ALIGN FINISHED FACE OF NEW GWB PARTITION WITH EXISTING FINISHED FACE OF WINDOW JAMB
 - PROVIDE GWB PARTITION RETURN TO CENTER LINE OF EXISTING MULLION, BLACK-OUT EXISTING GLAZING WITH 3M WINDOW TINT, PROVIDE A LEVEL 5 FINISH CORNER TO CORNER
 - SAND, PRIME AND PAINT EXISTING DOOR FRAMES
 - INFILL EXISTING WALL OPENING, WITH METAL STUD FRAMING AND 5/8" GWB, ALIGN NEW GWB WITH EXISTING ADJACENT SURFACE, PROVIDE A UNIFORM LEVEL 5 FINISH CORNER TO CORNER
 - INSTALL NEW SOLID SURFACE WINDOW SILLS
 - PATCH AND REPAIR ALL EXISTING EXTERIOR WALL SURFACES AS REQUIRED TO PROVIDE A UNIFORM LEVEL 5 FINISH PRIOR TO PAINT (TYP.)
 - PATCH AND REPAIR ALL EXISTING INTERIOR WALL SURFACES AS REQUIRED TO PROVIDE A UNIFORM LEVEL 5 FINISH PRIOR TO PAINT (TYP.)
 - ALIGN NEW 3 5/8" METAL STUD FRAMING WITH NEW 2 1/2" FURRING - INSTALL 5/8" GWB TO PROVIDE A FLAT UNIFORM LEVEL 4 FINISH
 - PROVIDE TWO (2) LAYERS OF 5/8" GWB AT THIS LOCATION TO MATCH EXISTING ADJACENT SURFACE, PROVIDE A UNIFORM LEVEL 5 FINISH CORNER TO CORNER
 - PROVIDE TWO (2) LAYERS OF 5/8" GWB AT THIS LOCATION, PROVIDE "J" BEAD TERMINATION TO ALIGN WITH NEW HEADER
 - FURR OUT EXISTING WALLS WITH 5/8" GWB ON 2 1/2" METAL STUD FRAMING

WALL TYPE LEGEND

	EXISTING WALLS
	WALLS TO BE REMOVED
	NEW CONSTRUCTION

- ### REFLECTED CEILING PLAN NOTES
- START CEILING GRID WITH FULL TILE AT THIS LOCATION
 - ALIGN CEILING GRID WITH ADJACENT WALL SURFACE
 - PAINT ON 5/8" GWB ON 22 GAUGE METAL STUD FRAMING SOFFIT
 - NEW SUSPENDED CEILING SYSTEM

REFLECTED CEILING PLAN LEGEND

	2X2 CEILING GRID		SUPPLY DIFFUSERS
	2X2 LAY-IN LIGHT FIXTURE (UNLESS NOTED OTHERWISE)		RETURN GRILLE
	RECESSED DOWNLIGHT		EXHAUST FAN
	SKYLIGHT DIFFUSER		EXIT SIGN



STUDIO MJG, LLC
5206 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - INTERIOR
RENOVATION**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

CONFORMANCE
DOCUMENTS

Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE
3	FO 03	3/9/2018

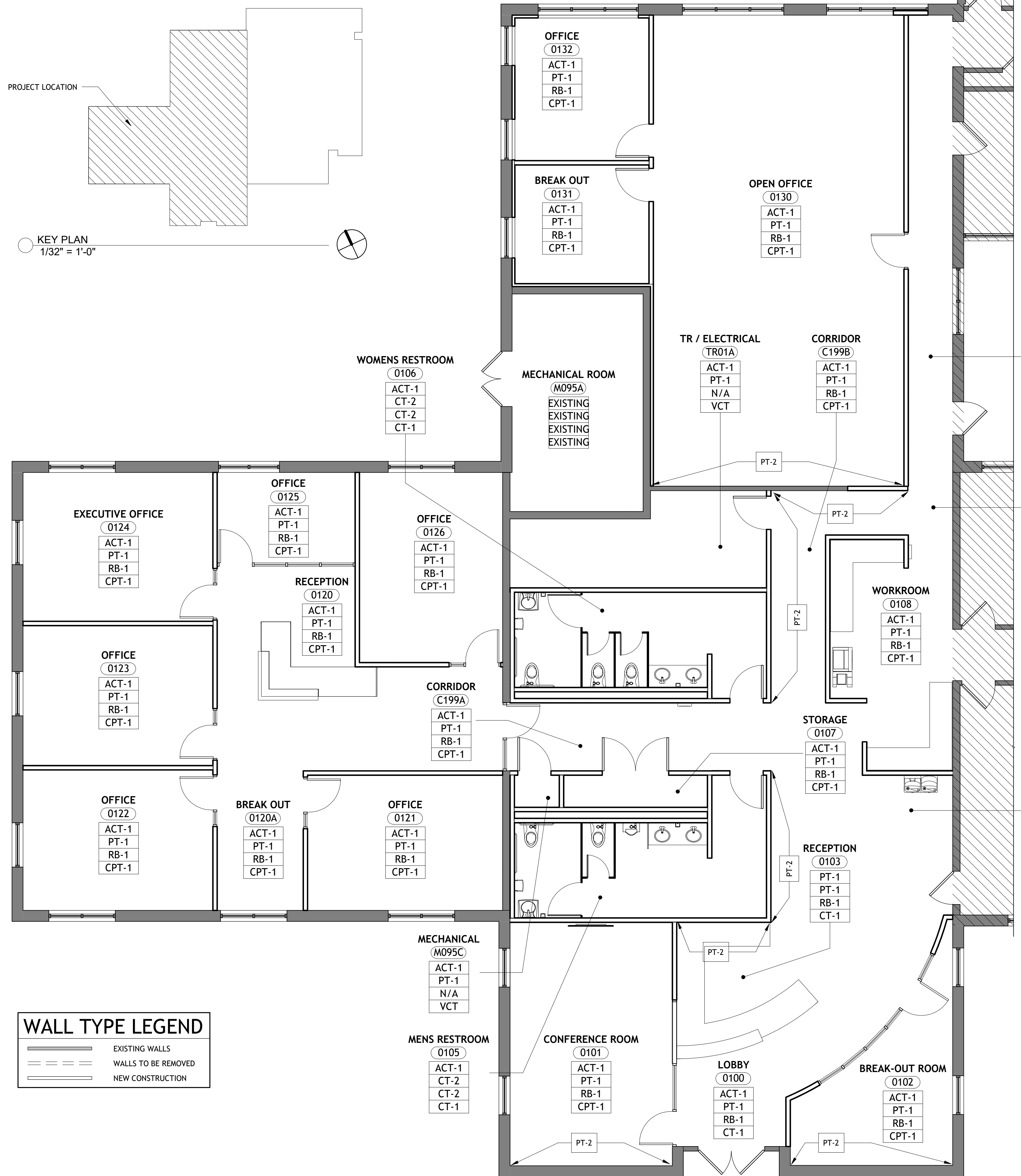
PROJECT NUMBER: 17016
ISSUE DATE: 1 NOVEMBER 2017
CREATED BY: MAR
CHECKED BY: MJG

A113
ARCHITECTURAL
FINISH FLOOR PLAN,
SCHEDULE AND
LEGEND

3/9/2018 10:13:13 AM

MARK	MATERIAL	MANUFACTURER	COLLECTION	COLOR	LOCATION	COMMENTS
ACT-1	ACOUSTIC TILE	ARMSTRONG	ULTIMA BEVELED TEGULAR 1894	WHITE 2x2	SUSPENDED CEILING	-
CPT-1	CARPET TILE	INTERFACE	ALTERED 51128	IMAGE 26557	-	HERRINGBONE
CT-1	CERAMIC TILE	DAL TILE	PORTFOLIO	DOVE GREY PF04	LOBBY & RESTROOMS	12 x 24
CT-2	CERAMIC TILE	DAL TILE	PORTFOLIO	IRON GREY PF06	LOBBY	6 x 24
PL-1	PLASTIC LAMINATE	WILSONART	STANDARD LAMINATE	IM BRIGHTON 11091K-07	-	-
PT-1	WALL PAINT	SHERWIN WILLIAMS	-	SW7005 PURE WHITE	-	FIELD
PT-2	WALL PAINT	SHERWIN WILLIAMS	-	SW6787 FOUNTAIN	-	ACCENT
PT-3	WALL PAINT	SHERWIN WILLIAMS	-	SW9168 ELEPHANT EAR	-	DOOR FRAME
RB-1	RUBBER WALL BASE	JOHNSONITE	RUBBER 4" COVE	32 PEBBLE	-	-
SS-1	SOLID SURFACE	WILSONART	-	MORNING ICE 9204CE	COUNTERTOPS	-
VCT-1	VINYL TILE	ARMSTRONG	STANDARD EXCELON	EARTHSTONE GREIGE 51804	-	-

NUMBER	NAME	FLOOR	BASE	WALL	CEILING	Comments
0100	LOBBY	CT-1	RB-1	PT-1	ACT-1	
0101	CONFERENCE ROOM	CPT-1	RB-1	PT-1	ACT-1	
0102	BREAK-OUT ROOM	CPT-1	RB-1	PT-1	ACT-1	
0103	RECEPTION	CT-1	RB-1	PT-1	PT-1	
0104	WAITING	CT-1	CT-1	PT-1	ACT-1	
0105	MENS RESTROOM	CT-1	CT-2	CT-2	ACT-1	
0106	WOMENS RESTROOM	CT-1	CT-2	CT-2	ACT-1	
0107	STORAGE	CPT-1	RB-1	PT-1	ACT-1	
0108	WORKROOM	CPT-1	RB-1	PT-1	ACT-1	
0120	RECEPTION	CPT-1	RB-1	PT-1	ACT-1	
0120A	BREAK OUT	CPT-1	RB-1	PT-1	ACT-1	
0121	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0122	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0123	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0124	EXECUTIVE OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0125	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0126	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0130	OPEN OFFICE	CPT-1	RB-1	PT-1	ACT-1	
0131	BREAK OUT	CPT-1	RB-1	PT-1	ACT-1	
0132	OFFICE	CPT-1	RB-1	PT-1	ACT-1	
C199A	CORRIDOR	CPT-1	RB-1	PT-1	ACT-1	
C199B	CORRIDOR	CPT-1	RB-1	PT-1	ACT-1	
C199C	CORRIDOR	CPT-1	RB-1	PT-1	ACT-1	
C199D	CORRIDOR	CPT-1	RB-1	PT-1	ACT-1	
M095A	MECHANICAL ROOM	EXISTING	EXISTING	EXISTING	EXISTING	
M095C	MECHANICAL	VCT	N/A	PT-1	ACT-1	
TR01A	TR / ELECTRICAL	VCT	N/A	PT-1	ACT-1	



	EXISTING WALLS
	WALLS TO BE REMOVED
	NEW CONSTRUCTION

2 ARCHITECTURAL FINISH FLOOR PLAN
3/16" = 1'-0"



STUDIO MJG, LLC
5206 SW 91ST TERRACE, SUITE A
GAINESVILLE, FLORIDA 32608
WWW.STUDIOMJG.COM

**MP02649 BUILDING 700 - INTERIOR
RENOVATION**
UNIVERSITY OF FLORIDA 3280 RADIO RD
GAINESVILLE, FL 32611

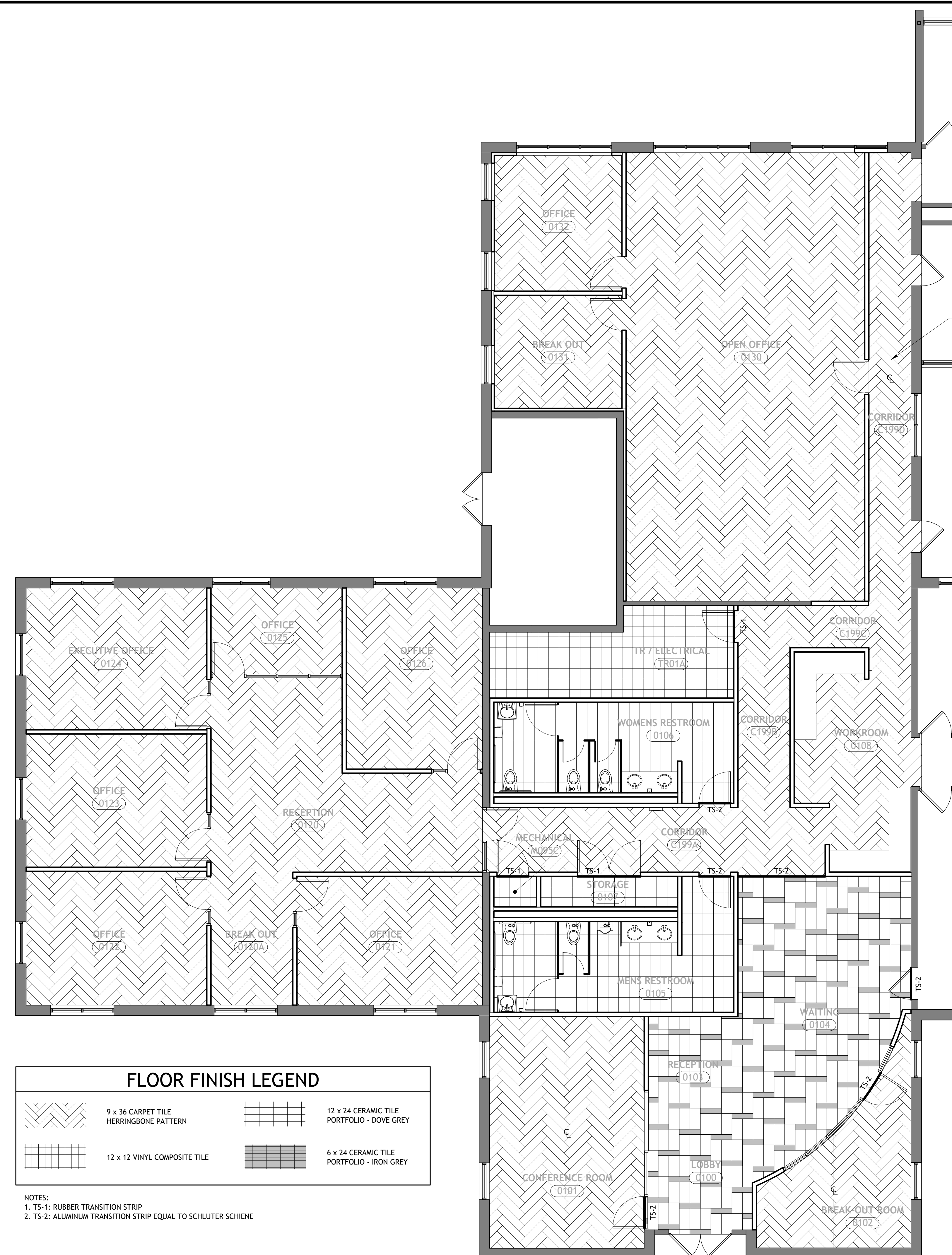
CONFORMANCE DOCUMENTS

Michael J. Gilfilen
AR94453

No.	DESCRIPTION	DATE
3	FO 03	3/9/2018

PROJECT NUMBER:	17016
ISSUE DATE:	1 NOVEMBER 2017
CREATED BY:	PAK
CHECKED BY:	MJG

A114
ARCHITECTURAL FLOOR FINISH PATTERN PLAN



BEGIN PATTERN BY CENTERING A FULL PLANK ON A 45 DEGREE ANGLE IN CORRIDOR

FLOOR FINISH LEGEND

	9 x 36 CARPET TILE HERRINGBONE PATTERN		12 x 24 CERAMIC TILE PORTFOLIO - DOVE GREY
	12 x 12 VINYL COMPOSITE TILE		6 x 24 CERAMIC TILE PORTFOLIO - IRON GREY

NOTES:
1. TS-1: RUBBER TRANSITION STRIP
2. TS-2: ALUMINUM TRANSITION STRIP EQUAL TO SCHLUTER SCHIENE

1 ARCHITECTURAL FINISH FLOOR PATTERN PLAN
3/16" = 1'-0"

