

COUNTY OF LEXINGTON

Procurement Services
212 South Lake Drive, Suite 503
Lexington, SC 29072
(803)785-8166 Fax (803)785-2240

AMENDMENT OF SOLICITATION

AMENDMENT NO.: TWO

ISSUE DATE: November 19, 2014

SOLICITATION NO.: B15016-11/20/14K

DATED: October 29, 2014

**PROJECT: ADMINISTRATION BUILDING ELEVATOR MODERNIZATION/
INSTALLATION PROJECT**

ADDENDUM SECTIONS:

1. **QUESTION:** I downloaded the specs from your website but do not see "Completion Time" or "Liquidated Damages" mentioned. Could you please elaborate?
ANSWER: The completion time for this project is 21 weeks from the Notice to Proceed with Liquidated Damages set at \$100.00 per calendar day.
2. **ADD:** Revised Bidders Schedule, Revised: 11/19/14 **(2 Pages)**
3. **ADD:** Table of Contents including Division 23, 26 and 28. **(115 Pages)**
4. **ADD:** Electrical Drawings – E0.1, E0.2, E0.3, E1.0, E1.1, E2.0, E3.0 and E4.0 **(8 Pages)**
5. **ADD:** Mechanical Drawings – M0.1, M0.2, M1.0 and M2.0 **(4 Pages)**
6. **The bid opening date and time remains the same, Tuesday, December 2, 2014 at 3:30 PM EST.**

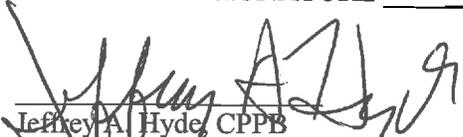
Offerors must acknowledge receipt of this amendment by one of the following methods: (a) By signing and returning one copy of this amendment with your bid; (b) By acknowledging receipt of this amendment on each copy of the bid submitted; or separate letter which includes a reference to the solicitation and amendment numbers. Failure of your acknowledgment to be received at the Purchasing Office prior to the hour and date of the opening may result in rejection of your offer. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter, provided such letter makes reference to the solicitation and this amendment and is received prior to the opening hour and date specified.


Kay Keisler
Procurement Officer

CONTRACTOR: _____

NAME & TITLE OF AUTHORIZED REPRESENTATIVE _____

AUTHORIZED SIGNATURE _____


Jeffrey A. Hyde, CPPB
Procurement Manager

COUNTY OF LEXINGTON
Procurement Services, 212 South Lake Drive, Suite 503, Lexington, SC 29072
Ph: (803) 785-8166 / Fax: (803) 785-2240

“REVISED” BIDDERS SCHEDULE

BID NUMBER: B15016-11/20/14K **DATE:** October 29, 2014

OPENING DATE AND TIME: *December 2, 2014 @ at 3:30 PM EST* **(REVISED)**

OPENING LOCATION: Lexington County Procurement Office
 County Administration Bldg., 5th Floor
 212 South Lake Drive, Suite 503, Lexington SC

PROCUREMENT: Provide all materials, equipment, and labor for **Administration Building Elevator Modernization/Installation Project** in accordance with the specifications, conditions, and provisions as applicable to this solicitation. All prices are to include all applicable shipping costs.

Delivery Requirements: FOB Destination-Freight Prepaid to Lexington, South Carolina.

ITEM NUMBER	QTY U/I	DESCRIPTION MFG/MDL/STK #	TOTAL PRICE
-------------	---------	---------------------------	-------------

BASE BIDS:

01	01 JOB	Modernization of two (2) existing traction passenger elevators and all associated electrical work (no mechanical work) in accordance with the drawings, specifications, conditions, and provisions as applicable to this solicitation.	\$ _____
02	01 JOB	Furnish and install one (1) passenger geared or gearless traction elevator equipment and all associated electrical work and mechanical work (relocate existing indoor AC unit and install new IDAC-1/ODAC-1) in accordance with the drawings, specifications, conditions, and provisions as applicable to this solicitation.	\$ _____
GRAND TOTAL (BASE BIDS 1 & 2)			\$ _____

ALTERNATES:

01	01 JOB	Renovation to the interior of the two (2) existing traction passenger elevators in accordance with the specifications, conditions, and provisions as applicable to this solicitation.	\$ _____
02	01 JOB	Remove the existing outdoor and indoor AC units (all associated electrical demolition work to be included) and furnish and install new IDAC-2/ODAC-2 (all associated electrical work to be included) in accordance with the drawings, specifications, conditions, and provisions as applicable to this solicitation.	\$ _____
GRAND TOTAL (BASE BIDS 1 & 2)			\$ _____

BIDDER: _____ **SIGNATURE:** _____

The attached Certificate of Familiarity must be returned with bid.

Delivery _____ Days after Receipt of Order

Bidder Checklist:

Bidder is acknowledging that the following items have been provided with the bid.

____ Bid Bond
Initial

____ Acknowledgement of Amendment(s)
Initial ____ of ____

____ Certificate of Familiarity
Initial

____ List of References
Initial

BIDDER: _____ SIGNATURE: _____

The attached Certificate of Familiarity must be returned with bid.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

TABLE OF CONTENTS

SECTION

DESCRIPTION

DIVISION 23 - HVAC

23 0501	General HVAC Requirements
23 0502	Common HVAC Materials
23 0510	Documentation and Closeout
23 0529	Hangers and Supports For HVAC Piping
23 0548	Sound, Vibration, and Seismic Control For HVAC
23 0553	Identification for Piping and Equipment
23 0592	System Start-Up
23 0593	Testing, Adjusting, and Balancing For HVAC
23 0700	HVAC Insulation
23 0719	HVAC Piping Insulation
23 0900	Instrumentation and Controls For HVAC (General)
23 2113	HVAC Piping (General)
23 9005	Heat Transfer (Electric Cooling)
23 9006	Heat Transfer (Electric Heaters)

DIVISION 26

26 0500	Electrical General Requirements
26 0501	Electrical Coordination
26 0502	Electrical Demolition
26 0503	Firestopping, Patching and Repair
26 0519	Wire and Cable
26 0526	Grounding
26 0533	Metallic Conduit /Raceways and Fittings
26 0535	Electrical Boxes
26 0548	Seismic Support of Electrical Equipment
26 2200	Dry Type Transformers
26 2416	Panelboards
26 2726	Wiring Devices
26 2816	Safety/Disconnect Switches
26 5100	Lighting

DIVISION 28

28 3111	Fire Alarm System
---------	-------------------

SECTION 23 0501 - GENERAL HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. The Heating, Ventilation, and Air Conditioning (HVAC) work shall include, but not be limited to, the following:
 - 1. Piping for HVAC system
 - 2. Air Conditioning
 - 3. Refrigeration

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

1.3 DELINEATION OF WORK: 3

- A. Provide all necessary coordination of information to installers who are performing work to accommodate Division 23 installations.
- B. If any items have been received in such condition that their installation will require additional work beyond the project scope of the work, the A/E shall be notified in writing within 10 working days of the date of delivery of the items. Any claims beyond 10 days will not be considered by the A/E.

1.4 QUALITY ASSURANCE:

- A. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. All equipment shall bear labels attesting to Underwriters Laboratories approval where subject to Underwriters Laboratories label service. Where no specific indication as to the type or quality of material or equipment is indicated, a first-class standard article shall be furnished. All manufacturers of equipment and materials pertinent to these items shall have been engaged in the manufacture of said equipment a minimum of three (3) years and, if so directed by the Engineer, be able to furnish proof of their ability to deliver this equipment by submitting affidavits supporting their claim.
- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code Ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible. Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- C. All materials with a manufacturers listed shelf life shall be used at least six months prior to the expiration of the materials' shelf life.

1.5 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Submit all items necessary to obtain all required permits to the appropriate Regulatory Agencies, obtain all required permits, and pay all required fees.
- B. Where Codes and Standards are referenced, they shall be the date stated in these specifications or on the drawings. If none stated, they shall be the latest edition.
- C. All work shall conform to the following Building Codes:
 - 1. International Building Codes
 - 2. National Fire Protection Association
- D. All work shall conform to all federal, state, and local ordinances.
- E. Where applicable, all fixtures, equipment, and materials shall be as approved or listed by the following:
 - 1. Factory Mutual Laboratories (FM)
 - 2. Underwriters Laboratories, Inc. (UL)

1.6 STANDARDS AND PROCEDURES

- A. All work shall meet or exceed the standards and procedures of the following:
 - 1. ARI: American Refrigeration Institute
 - 2. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
 - 3. ASME: American Society of Mechanical Engineers
 - 4. ASTM: American Society of Testing and Materials
 - 5. MSS: Manufacturers Standardization Society
 - 6. NEMA: National Electrical Manufacturer's Association
 - 7. OSHA: Occupational Safety & Health Administration

1.7 APPROVAL OF SUBSTITUTIONS:

- A. Specific reference in the specifications to any article, device, product, materials, fixture, form or type of construction, etc., by name, make, or catalog number, with or without the words "or equal", shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. The Contractor in such

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

cases may, at his option, use any article, device, product, material, fixture, form or type of construction which, in the judgment of the A/E expressed in writing, is equal to that named. Where quality and other characteristics are very nearly the same, the question of determining equal materials and readily available service sometimes resolves itself to a matter of personal opinion and judgment and in these and all other cases involving the approval of materials, the opinion, judgment and decision of the A/E shall be final and bind all parties concerned.

- B. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified shall be submitted for approval in writing ten (10) calendar days prior to bid opening date to the A/E. Requests shall be accompanied by samples, literature, and information as necessary to fully identify and allow appraisal of the material or equipment. Submittals shall be concise, clear, and brief as possible. Incomplete submittals or submittals requiring lengthy research to ascertain quality will not be considered.
- C. Approval of the A/E to use materials or equipment, if granted, will be in the form of a written addendum. Approved substitutions may be used at the Contractor's option. No substitutions will be allowed if substitutions are requested later than ten (10) days prior to bid opening date.
- D. Items approved shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly indicated in the form of a letter that is enclosed with the submittals. The Contractor shall be responsible for verifying all dimensions with available space. If, in the opinion of the A/E, the physical dimensions do not permit the substituted material or equipment to be properly operated, maintained, serviced, or otherwise accessed, or the physical dimension adversely impact other components, a system's ability to be operated, maintained, serviced or otherwise accessed, the material or equipment shall be replaced at the Contractor's expense.

1.8 VERIFICATION OF DIMENSIONS AND LOCATIONS:

- A. The Contractor shall visit the facility and become thoroughly familiar with all details of the work, working conditions, dimensions and clearances.
- B. Notify the A/E of any discrepancy between actual conditions and conditions indicated on the contract documents that could cause changes, other than minor ones, to the installation of any systems or equipment.

1.9 EQUIPMENT CONNECTIONS:

- A. The contract documents may indicate specific electrical and piping connection locations to equipment. Each manufacturer approved for bidding may have different connection arrangements. The Contractor is responsible for the modifications to and the extension of connecting components as required for the equipment provided.
- B. The Contractor shall bear all costs for required changes in connection to equipment.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

1.10 WORKMANSHIP:

- A. Workmen shall be thoroughly experienced and fully capable of installing the work. Work shall be in accordance with the best standard practice of the trade. Work that is not of good quality will require removal and reinstallation at no additional expense to Owner.
- B. All material and equipment to be installed in accordance with manufacturer's printed recommendations using recommended accessories. Retain a copy on job site and submit others for approval when required.

1.11 GUARANTEES AND WARRANTIES:

A. General:

- 1. Furnish to the A/E a guarantee form, included in these specifications, signed by the Contractor and Owner agreeing to the start and end dates of all systems and equipment under warranty.
- 2. All defective materials or inferior workmanship shall be replaced or repaired as directed by the Owner's representative during the guarantee period.

B. Equipment Warranties:

- 1. Equipment shall be warranted by the equipment manufacturer. Where labor is included in the warranty, the manufacturer, at their option, may permit the contractor to provide the required repairs on the equipment unless specified otherwise.
- 2. The equipment manufacturer shall include a written guarantee with the closeout documentation.

C. Duration Period:

- 1. For work not otherwise specified, the duration shall be one year from substantial completion including all parts, labor, and other charges.
- 2. The Contractor is responsible for purchasing from the equipment manufacturers any additional warranties to ensure that the equipment is warranted by the manufacturer through the duration period specified.

D. Extended Warranties:

- 1. Warranty periods shall be extended where specifically stated in these specifications.
- 2. The extended warranties shall meet the requirements of the base warranty unless specifically noted otherwise.
- 3. The extended warranty time listed is time in addition to the base warranty period.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

4. The following systems or equipment shall be extended warranties:
 - a. All air conditioning compressors shall be provided with an extended 4-year warranty, including parts and delivery charges.

E. Non-Warranted Items:

1. Non durable replaceable items such as air filter media do not require replacement after the date of acceptance.

1.12 EXISTING FACILITIES:

- A. The location of pipe, equipment and appurtenances for existing facilities are shown on plans to indicate the extent of work required. Exact condition shall be field verified.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRIOR CONDITIONS:

- A. Prior to the installation of any equipment or system component, the Contractor shall review any prior work that has been completed to accommodate the equipment or system component to be installed.
- B. If the prior work does not make a proper installation of any equipment or system component possible, notify the A/E prior to installation of any equipment or system component.

3.2 INSTALLATION:

- A. Install all equipment and appurtenances in strict accordance with the manufacturer's recommendations and the manufacturer's shop drawings.
- B. If any equipment cannot be installed in accordance with Codes, contract documents, manufacturer's recommendations and accepted practices, notify the A/E in writing prior to installation of equipment.
- C. If any system component cannot be installed in accordance with Codes, contract documents and accepted practices, notify the A/E in writing prior to installation of the system component.

3.3 PROTECTION OF SYSTEMS AND EQUIPMENT:

- A. Protect all materials and equipment from damage during storage at the Site and throughout the construction period. In the event of damage prior to final inspections, repair or replace damaged items as determined by the A/E, at no cost to the Owner.
- B. Store equipment on elevated supports and cover them on all sides with securely fastened waterproof coverings. All equipment openings shall be securely sealed.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- C. Piping shall be protected by storing it on elevated supports and capping the ends.
- D. During construction, all open ends of pipe, etc. which could collect construction debris shall be properly capped.

3.4 CLEANING OF SYSTEMS AND EQUIPMENT:

- A. All equipment and systems shall be cleaned of all extraneous materials to leave equipment and system finish in a new condition.
- B. Where equipment and systems cannot be properly cleaned, take all measures necessary to replace or repair equipment and systems to bring back to a "like new" condition. All costs shall be borne by the Contractor.
- C. All extraneous materials shall be removed on the site on a regular basis to provide access to all work as well as a safe working environment.

3.5 SUPPORT OF SYSTEMS:

- A. Hanging duct, piping, or equipment from un-reinforced metal roof decks (i.e., metal roof deck w/o concrete) is not permitted.
- B. The following methods of support are not permitted:
 - 1. Wire hangers unless specifically indicated
 - 2. Perforated straps
 - 3. Vinyl or plastic straps

END OF SECTION

SECTION 23 0502 - COMMON HVAC MATERIALS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the installation of the mechanical systems where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

1.3 QUALITY ASSURANCE:

- A. All work shall meet or exceed the standards and procedures (latest edition) of the following:
1. AISC Steel Handbook
- B. All work shall be applicable by mechanics normally employed in the trade. All work shall be installed in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 FASTENERS, ANCHORS, AND ACCESSORIES:

- A. Unless indicated otherwise, all fasteners, anchors, and accessories shall be metallic and manufactured in the United States.
- B. Materials provided shall be considered industry standard for commercial or industrial use.
- C. All materials shall be installed in accordance with the manufacturer's recommendations for the intent use and application.
- D. Materials installed outdoors, in attics, in crawl spaces, in tunnels and other areas exposed to ambient temperature or humidity shall be stainless steel or hot dipped galvanized.
- E. Unless otherwise specified or required by the manufacturer, bolts shall meet or exceed the following strengths:
1. Proof Load: 74 ksi
 2. Yield Strength: 81 ksi
 3. Tensile Strength: 105 ksi

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.2 SEALANT:

- A. Exterior joint sealant shall be polyurethane base, multi-component; self-leveling type for application in vertical joints; capable of withstanding movement of up to 50% of joint width and satisfactorily handled throughout temperature of 4 to 27 degrees C.; uniform, homogeneous, and free from lumps, skins and coarse particles when mixed; Shore "A" hardness of minimum 15 and maximum 50; non-staining; non-bleeding.
- B. Penetrations and fire rated assemblies shall meet the requirements of the Firestopping and Smokestopping specification.
- C. Color shall be approved by A/E.

PART 3 - EXECUTION

3.1 EQUIPMENT ATTACHMENT:

- A. Equipment shall be secured to the building or structure. Where equipment is provided with a method of attachment, they shall be used to attach the equipment. Where equipment is not provided with a method of attachment, the contractor shall add gussets, angles, or similar material to the unit without affecting the performance or warranty of the equipment, which shall be used to attach the equipment.

END OF SECTION

SECTION 23 0510 - DOCUMENTATION AND CLOSEOUT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. Furnish all labor, materials, tools and equipment and perform all operations in connection with the project documentation and closeout.

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL:

- A. All reports, forms, and manuals shall be submitted to the A/E in triplicate unless additional copies are noted.
- B. Report, forms, and manuals are to be submitted as soon as possible, but no later than thirty (30) days after the earliest date they can be prepared.

3.2 OWNER TRAINING:

- A. The contractor shall schedule the training on equipment and systems at least 21 days before training is to take place. The contractor shall provide multiple dates and times for the training to allow the Owner to coordinate the schedules of their staff to be trained.
- B. The contractor shall provide all training aids, manuals, etc. for the Owner's staff at the training classes. These are in addition to whatever is required for the Operations and Maintenance manuals. The contractor shall coordinate the number required with the Owner but shall include a maximum of 8 sets for the training class.
- C. The person providing the training shall be thoroughly knowledgeable in the subject matter.

3.3 PROJECT JOB DRAWINGS AND AS-BUILT DRAWINGS:

- A. Keep a record set of drawings on the job and, as construction progresses, shall show the actual installed location of all items, material, and equipment on the project job drawings.
- B. At the time of final inspection, one corrected set of prints shall be delivered to the A/E. All drawing costs to be by the Contractor.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- C. As built drawings shall have the information transferred from the project job drawings including all addendum, supplemental instructions, change orders, and similar information.
- D. Qualified draftsmen shall perform this task.

3.4 OPERATING AND MAINTENANCE MANUAL:

- A. Compile and bind three (3) sets of all manufacturer's instructions and descriptive literature on all items of equipment furnished under this work.
- B. Binder shall be hard cover, three-ring notebook, embossed with the name of the project, 11" x 8-1/2" with heavy duty rings. Maximum binder size shall be 2-1/2".
- C. The spine of the binder shall be titled "HVAC Operating and Maintenance Manual" with the name of the project and the date under the title.
- D. The Operating and Maintenance Manual shall include the following:
 - 1. Cover sheet in each binder listing the architect, engineer, and all contractors. List addresses and contact information.
 - 2. List name, address and phone number of organization responsible for warranty work, if other than Contractor, and the specific work for which he is responsible.
 - 3. List name, address and phone number of the nearest sales and the nearest service organization for each product.
 - 4. Schedules of all equipment including identification tag numbers shown on plans cross referenced to field applied identification tag numbers.
 - 5. Performance Curves: For fans and similar equipment at the operating conditions.
 - 6. Lubrication Schedule: Indicating type and frequency of lubrication required.
 - 7. List of Spare Parts: Recommended for normal service requirements. Each piece of equipment shall have this list clearly marked or attached to this submittal.
 - 8. Parts List: Identifying the various parts of the equipment for repair and replacement purposes.
 - 9. Instruction Books: May be standard booklets but shall be clearly marked to indicate applicable equipment and characteristics.
 - 10. Wiring Diagrams: Generalized diagrams are not acceptable, submittal shall be specifically prepared for this Project.
 - 11. Automatic Controls: Diagrams and functional descriptions.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

12. All start-up reports for all equipment.

13. Test and balance report.

3.5 ENGINEERING FIELD REPORTS AND FINAL INSPECTION REPORTS:

- A. The A/E will review the Contractor's work periodically throughout the project. A report will be submitted to the Contractor.
- B. The reports shall be responded to within ten days of receipt by the Contractor. Each item shall be addressed with comments written on the inspection report if possible. Contractor's response shall address the status of each item and all discrepancies.

3.6 OPERATION AND MAINTENANCE INSTRUCTIONS:

- A. After all final tests and adjustments have been completed, the Owner's Representatives shall be instructed in all details of operation and maintenance for the systems installed.
- B. Instruction periods shall be as designated by the Owner.
- C. Instruction shall be provided as follows:
 - 1. Equipment: Trained factory representative

3.7 ACCEPTANCE:

- A. Upon notification by the Contractor and after completion of Operation and Maintenance Instructions, the A/E will visit the project for a demonstration of the building system and an inspection of the completed work.
- B. Items which do not comply with the Contract Documents or which function incorrectly will be listed. The list will be provided by the A/E to the Contractor for correction of the installed work.
- C. After all corrections have been made, the Contractor shall notify the A/E who will recheck the systems for compliance of all items listed.

PART 4 - STANDARD FORMS

4.1 GENERAL:

- A. All forms shall be completely filled out by the Contractor prior to acceptance of the project by the A/E.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
 INSTALLATION & RENOVATION

4.2 HVAC CLOSEOUT LIST:

HVAC CLOSEOUT DOCUMENT PROJECT: Lexington County Administration Building Elevators BGA PROJECT NO.: 14093		
DOCUMENT	DATE REVIEWED	COMMENTS
Test & Balance (Airside)		
HVAC O&M Manual (3 sets)		
HVAC marked-up As-Builts (1 set red lined)		
Equipment Start-Up Reports		
Punchlist dated _____		
Punchlist dated _____		
Punchlist dated _____		
Walk-Through with Owner		
NOTE: Not all closeout documents may be listed. See other sections of specifications for additional requirements.		

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
 INSTALLATION & RENOVATION

4.4 INSTRUCTIONS TO OWNER:

OWNER INSTRUCTIONS SIGN-IN SHEET				
PROJECT: Lexington County Administration Building Elevators				
BGA PROJECT NO.: 14093				
SYSTEM/EQUIPMENT:	DATE	TIME		LOCATION:
		START	FINISH	
INSTRUCTORS (PRINT NAME AND SIGN)				
1. _____				
2. _____				
ATTENDEES (PRINT NAME AND SIGN)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
WRITTEN MATERIALS PROVIDED TO ALL ATTENDEES: _____ YES _____ NO				
INSTRUCTIONS IN CLASSROOM: _____ YES _____ NO				
INSTRUCTIONS IN FIELD: _____ YES _____ NO				

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

END OF SECTION`

SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of supports and anchors on all piping and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0548 – Sound, Vibration, and Seismic Control for HVAC
2. Section 23 0719 - HVAC Piping Insulation
3. Section 23 2113 - HVAC Piping (General)

1.3 QUALITY ASSURANCE:

A. Products not otherwise specified in these documents shall be furnished by the listed manufacturers and installed in accordance with the manufacturers recommendation.

B. Products used shall be consistent with industry practice for use in commercial or industrial installation.

C. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following as referenced (latest editions):
 - a. ANSI B31.3 - Pressure Piping
 - b. Factory Mutual
 - c. International Building Codes
 - d. Manufacturer's Standardization Society Documents, MSS-SP-58, MSS-SP-69
 - e. Pipe Fabrication Institute, Standard ES-26
 - f. AISC Specification for the Design, Fabrication, and Erection of Structural Steel Buildings

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

D. Manufacturers:

1. The following pipe hanger and support manufacturers are acceptable:
 - a. B-Line
 - b. Pipe Hangers and Devices Mfg. Inc.
 - c. Anvil International

PART 2 - PRODUCTS

2.1 GENERAL:

- A. It shall be the Contractor's responsibility to provide an adequate pipe support system in accordance with recognized engineering practices using, where possible, standard, commercially available hangers, support, guides, anchors and accessories.
- B. Model numbers are indicated for products not exposed to ambient conditions. The products exposed to ambient conditions shall be a similar product but with the material or finish specified for products exposed to ambient conditions.
- C. Materials shall be selected to prevent electrolysis and minimize corrosion for the environment in which the product is to be installed.
- D. Hanger shall be sized for insulation to run through hanger.

2.2 SAFETY FACTOR:

- A. All attachments, rods, and accessories selected based on weight load shall be selected for a two times safety factor minimum.

2.3 SEISMIC RESTRAINTS:

- A. Where seismic restraints of components is required, attachments shall be per the requirements of the Vibration and Seismic Controls specifications.

2.4 PRODUCTS EXPOSED TO AMBIENT CONDITIONS:

A. Materials:

1. The material for all accessories including, but not limited to, rods, bolts, fasteners, inserts, saddles, supports, anchors, clamps, auxiliary steel, and accessories shall be stainless steel or hot dipped galvanized unless specifically noted otherwise.

B. Hangers:

1. Clevis hanger shall be stainless steel or hot dipped galvanized finish.
2. Swivel loop hangers shall be zinc electroplate finish.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

C. Shields:

1. Shields shall be stainless steel.

2.5 PIPE HANGERS, SUPPORTS, AND ACCESSORIES - GENERAL (INDOOR):

A. Hangers:

1. Swivel loop hangers for insulated pipe shall be carbon steel with zinc electroplate finish.
2. Clevis hangers for insulated pipe shall be carbon steel or carbon steel with zinc electroplate finish.

B. Shields:

1. Shields shall be carbon steel with zinc electroplate finish.

2.6 PIPE HANGERS - INSULATED PIPING:

A. Pipe up to 2" - Swivel loop hanger with shield:

1. Anvil Model No. 69 with 167 shield
2. At contractor's option, clevis hanger may be used.

2.7 PIPE HANGERS - NON INSULATED PIPE (COPPER):

A. All pipe sizes - Swivel loop hanger:

1. Anvil Model No. 69 (with PVC coating)

2.8 PIPE HANGER SPACING:

A. General:

1. The maximum spacing for pipe hangers and supports shall not exceed those stated in these specifications or the hanger manufacturer's recommendations, which is less.
2. Where concentrated loads of valves, fittings, etc. occur, closer spacing will be necessary and shall be based on the weight to be supported and the maximum recommended loads for the hanger components.
3. Hangers shall be provided within 12" of each change of direction, at each valve, and at equipment connections.
4. Pipe not listed shall meet the spacing requirements of the manufacturer.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

B. Copper Pipe and Tubing:

<u>Size</u>	<u>Max. Span Ft.</u>
Less than 1-1/2"	5

2.9 HANGER RODS:

- A. Threaded rods, if not indicated otherwise, shall be carbon steel with zinc electroplate finish.
- B. Where seismic restraints of components are required, rod sizes shall be per the requirements of the Mechanical Sound, Vibration, and Controls specifications.
- C. Rod capacity based upon ASTM A107 at 650 degrees F is as follows:

<u>Rod Dia.</u>	<u>Max. Load</u>	<u>Max. Load (@ 2 x SF)</u>
3/8	610	305

2.10 AUXILIARY SUPPORTS, FASTENERS, AND ACCESSORIES:

- A. Provide all auxiliary supports, anchors, and fasteners necessary for the installation of piping, equipment, and accessories.
- B. Supports shall include angles, channels, flat steel, rods, bolts and appurtenances.
- C. Special supports shall be provided where standard hanger, supports, or attachments cannot be used. This includes, but is not limited to, use of trapeze supports, suspending supports from other supports (where acceptable to manufacturers, etc.).

2.11 CHANNEL SUPPORTS:

- A. General:
 - 1. Channel supports shall be utilized wherever practical and whenever a channel support provides a cleaner installation than individual attachments to the structure.
- B. Construction:
 - 1. Channel supports shall be 12 gauge minimum and dimensions as necessary to meet project conditions.
 - 2. Channels in conditioned spaces or in plenums above conditioned spaces shall be pregalvanized or powder coated carbon steel.
 - 3. Channels exposed to ambient conditions shall be hot dipped galvanized after fabrication, aluminum, stainless steel, PVC coated, or epoxy coated.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

4. Channels shall have holes, slots, knockouts, etc. as required by the Contractor.
- C. Clamps and Accessories:
1. Clamps, accessories, fasteners, etc. shall generally be the same materials as the channel supports unless indicated otherwise.
 2. Pipe clamps for indoor pipe shall have a pipe cushion.
- D. Manufacturers shall be:
1. Erico Eristrut
 2. Unistrut

2.12 ROOF MOUNTED DRAIN LINE SUPPORT:

- A. General:
1. Support shall be constructed of UV resistant rubber.
 2. Attached to the rubber base are two ½" zinc threaded rods with a 14 gauge channel support.
 3. The channel support height is adjustable.
 4. The support shall be suitable for a minimum load of 150 lb.
 5. Metal components shall be galvanized.
- B. Manufacturers shall be:
1. Mifab CE

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Provide all steel required for support of pipes.
- B. Contractor shall bear all responsibility for materials and workmanship as described in this section, and shall make sure that all hangers and supports are properly and permanently connected to building structure.
- C. All pipe supports shall be designed to avoid interferences with other piping, hangers, electrical conduits and supports, building structures and equipment.
- D. Provide hanger rod nuts on both sides of clevis and trapeze hangers.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.2 SUBMITTAL:

- A. Manufacturer shall be responsible for reviewing all plans, specifications, and existing conditions to determine the types, quantities, and accessories required to provide a complete system of pipe support.
- B. Submit shop drawings for each product to be used and indicate where the product is to be installed (i.e., steam piping in tunnel, chilled water pipe in crawl space, etc.).

3.3 AUXILIARY SUPPORTS, ANCHORS, AND FASTENERS:

- A. Supports attaching to steel structure shall be by bolting or clamping without penetrating structural member. Welding is not permitted without written permission.
- B. All fasteners shall be provided which resist loosening from vibration.

END OF SECTION

SECTION 23 0548 – SOUND, VIBRATION, AND SEISMIC CONTROL FOR HVAC

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of mechanical sound, vibration, and seismic control required on all mechanical equipment, systems, and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All seismic equipment and design shall comply with all local codes and ordinances and meet or exceed the standards and procedures (latest editions) of the following:
 - a. International Building Codes
 - b. SMACNA Seismic Restraint Manual
 - c. ASHRAE
 - d. ASTM E 488 (Anchor locations)

- B. Mechanical sound, vibration and seismic control equipment shall be sized and provided by manufacturer only. Seismic bracing shall be a factory manufactured item listed in the manufacturers catalog for the intended use.

C. Manufacturer:

1. The following sound, vibration, and seismic control manufacturers are acceptable:
 - a. Mason Industries
 - b. Korfund Dynamics Company
 - c. Vibration Mountings and Controls, Inc.
 - d. Peabody
 - e. Amber Booth

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- f. Vibration Eliminator, Inc.
- g. Vibro-Acoustics Corporation

PART 2 - PRODUCTS

2.1 GENERAL:

- A. All equipment and piping shall be mounted on or suspended from approved supports as specified herein and as shown on the drawings.
- B. Components not exposed to ambient:
 - 1. Steel components shall be powder coated. All nuts, bolts, and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc-chromate or metal etching primer.
- C. Components exposed to ambient:
 - 1. All components shall be PVC coated steel, hot-dip galvanized, stainless steel, or heresite coated.

2.2 SEISMIC DESIGN:

- A. General:
 - 1. Specifications and plans shall indicate minimum requirements and general intent. The actual requirements shall be determined by the contractor's seismic system engineer but those requirements shall not be less than indicated on the plans and in these specifications.
 - 2. The seismic engineer shall be a professional engineer registered in the state in which the facility is to be constructed and whose principal area of practice is in seismic engineering and related fields. The engineer shall be in the full time employment of the company submitting the product. The seismic engineer shall be responsible for:
 - a. Submittals (drawings and calculations)
 - b. Seismic Quality Assurance Plan
 - c. Certificates of Compliance

2.3 WIND LOAD DESIGN:

- A. General:
 - 1. Specifications and plans shall indicate minimum requirements and general intent. The actual requirements shall be determined by the contractor's structural engineer but those requirements shall not be less than indicated on the plans and in these specifications.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. The structural engineer shall be a professional engineer registered in the state in which the facility is to be constructed. The structural engineer shall be responsible for:
 - a. Submittals (drawings and calculations)
 3. All equipment located outdoors shall be designed to meet or exceed the requirements of the current IBC wind load requirements.
 4. Calculations shall be based on the ASCE determined design pressure, exposure class, building height, and building type.
- B. All outdoor equipment shall be anchored to withstand the IBC wind load requirements.
- C. Where additional bracing or tie downs are required, they shall be provided at no additional cost to the Owner.
- D. Coordinate the restraints required for wind loading with the seismic and vibration requirements indicated on the drawings and specifications.

2.4 ANCHORAGE TO BUILDING STRUCTURE:

- A. General:
1. Anchorage to the building structure shall meet the latest requirements of:
 - a. International Building Code (Chapter 19)
 - b. ASCE Standard 7-05 (Chapter 13)
 - c. American Concrete Institute (ACI) 318
 2. Requirements of this section of specifications are minimum requirements. When other requirements are indicated, the greater requirement shall be met or exceeded.
- B. Anchorage in Concrete or Masonry:
1. Calculation of anchorage forces shall be provided by the seismic engineer for all installations in Seismic Design Category C, D, E, and F.
 2. The following anchorage and attachments are not permitted:
 - a. Power driven fasteners for tension load applications in Category D, E, and F unless specifically approved for this application.
 - b. Friction clips.
- C. Post Installed Anchors:
1. Post installed anchors for Seismic Design Category C, D, E, and F shall meet the requirements of ACI 318.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

D. Threaded Rod Supports:

1. Rod supports shall be designed to resist bending moments.
2. Threaded rod supporting duct, piping, equipment, or other components shall connect to structure by use of a swivel, eyebolt, vibration isolation hanger or other connection

2.5 VIBRATION AND SEISMIC ACCESSORIES:

- A. Provide all necessary brackets, bolts, fasteners, accessory components and materials to install systems in accordance with manufacturer's requirements.

PART 3 - EXECUTION

3.1 GENERAL:

- A. If the equipment to be mounted or restrained is not furnished with integral structural frames and external mounting lugs (both of suitable strength and rigidity), approved members shall be installed in the field which shall provide means of attaching required vibration and seismic devices.
- B. The members include, but not limited to the following: gussets, rails, brackets, angles, channels and similar components. These members should be sized by the vibration and seismic vendor to provide an acceptable installation.
- C. All field installed components shall be neatly installed and be of materials and/or finish suitable for the installation.

3.2 SUBMITTALS (SEISMIC LOAD):

A. Seismic Restraints:

1. Submit drawings showing seismic loading, location of bracing, and types and sizes of bracing assemblies. The level of detail and information provided shall be similar to those included in the "SMACNA Seismic Restraint Manual."
2. Submit seismic protection ratings in three principle axes certified by an independent laboratory.
3. Submit calculations for shear, pull-up, primary overturning, and secondary overturning.
4. Submit drawings indicating auxiliary supports and method of attachment.
5. Submit drawings indicating size and type of attachment (i.e., welding, bolting, etc.) to:
 - a. Attachment of equipment to equipment supports.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- B. Attachments and Connections:
 - 1. Submit drawing indicating type of connection (i.e., clamp, eye bolt, swivel, etc.) to:
 - a. Beams
 - b. Joists
 - c. Structure members
 - 2. Submit drawings indicating type of attachment (welding, bolting, etc.) to:
 - a. Structural members
 - b. Components or equipment
- C. Calculations shall be submitted and signed by a licensed professional engineer in the state where the project is located.

3.3 SUBMITTALS (WIND LOAD):

- A. Submit drawings and calculations showing wind loading, location of anchors, ties and bracing, and types and sizes of restraints.
- B. Submit drawings showing auxiliary supports and method of attachment.
- C. Submit drawings and calculations showing the attachment of equipment to structure.

END OF SECTION

SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of mechanical identification on all mechanical equipment, systems, and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work furnished and installed shall comply with all local codes and ordinances and shall meet or exceed the standards and procedures (latest editions) of the following:
 - a. ANSI A13.1 for the identification of piping systems.
 - b. ANSI/NEMA Standard Z535.1.

B. Manufacturer:

1. The following mechanical tag, band, nameplate, and identification marker manufacturers are acceptable:
 - a. Seton Name Plate Corporation
 - b. T&B/Westline Products
 - c. Brady
 - d. MSI

PART 2 - PRODUCTS

2.1 NAMEPLATES:

A. General:

1. Nameplates shall be black plastic with white engraved lettering.
2. All information shall be provided on a single nameplate per device if practical.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3. Nameplates shall have screw holes and screws for mounting unless screws would damage the intended use of the product to which it is attached (i.e., NEMA4 panel, etc.). In that case, provide stick-on nameplates.
4. Nameplates shall be 1/16" thick.

B. Size:

1. Two inch (2") high nameplate when located on rooftop HVAC equipment.
2. Two inch (2") high nameplate when located on indoor HVAC equipment.
3. Three-quarter inch (3/4") high nameplate when located on control devices such as thermostats, sensors, etc.
4. Three-quarter inch (3/4") high nameplates when located on starter and panels.

2.2 MOTOR CONTROL IDENTIFICATION:

A. Devices to be identified include:

1. Stand-alone controllers and starters
2. Factory mounted controllers and starter
3. Similar equipment

B. Nameplate shall include:

1. Equipment Description: HW Pump #1

2.3 SWITCHES, THERMOSTATS, AND OTHER SIMILAR DEVICES:

A. Devices to be identified include:

1. Thermostats

B. Nameplate shall include:

1. Equipment description: HV #1, etc.

2.4 ROOFTOP EQUIPMENT:

A. Devices to be identified include:

1. Condensers

B. Nameplate shall include:

1. Equipment description: EF #1, etc.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

PART 3 - EXECUTION

3.1 NAMEPLATES:

- A. Submit listing of all nameplates with associated information to A/E for approval before fabrication.
- B. Coordinate method of attachment and location of nameplate with contractor who is responsible for the installation of the device (i.e., control panel, air handler, etc.).

END OF SECTION

SECTION 23 0592 - SYSTEM START-UP

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the start-up of all building mechanical systems where shown on the drawings and specified hereinafter.

B. Description:

1. These systems shall include:
 - a. Refrigeration systems

1.2 RELATED DOCUMENTS:

A. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0593 - Testing, Adjusting, and Balancing for HVAC

1.3 QUALITY ASSURANCE:

A. Codes and standards:

1. All work shall meet or exceed the standards and procedures of the following (latest edition):
 - a. AABC National Standards
 - b. SMACNA

B. Start-up of equipment shall be by manufacturer's representative unless noted otherwise.

C. Tests, in addition to those specified herein, required to prove code compliance, to meet insurance requirements, and to verify proper installation by the A/E, owner, or authorities having jurisdiction shall be provided by the Contractor.

D. All tests, instruments, and procedures shall be in accordance with the AABC National Standards and system test and balance specifications.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. In no case shall a system be started or operated in such a manner that the system or component pressure or temperature ratings, or the pressure or temperature to which a system or component has been tested, be exceeded.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.2 START-UP:

- A. Systems shall be started up by the Contractor except as required in specific portions of the mechanical specifications.
- B. The following systems shall be started up by a factory certified technician:
 - 1. Split system air conditioning equipment

2.3 STARTING THE PIPING SYSTEMS:

- A. Prior to putting any piping system in service, it shall be tested and thoroughly cleaned according to the procedures as specified below and as required by the equipment manufacturer, whichever requirement is more stringent.
- B. Dehydration of Refrigerant Piping Systems:
 - 1. Dehydrate refrigerant piping systems using a vacuum pump.
 - 2. The systems shall be evacuated to 500 microns and held there for three hours.
 - 3. The vacuum shall be broken with dry refrigerant.
 - 4. This procedure shall be repeated three times in succession.
 - 5. After the last repetition, fill the system with its operating charge of refrigerant.

2.4 PIPING SYSTEM TESTS:

- A. General:
 - 1. Upon completion of each system of work under this Division and at a designated time, all piping shall be pressure tested for leaks.
 - 2. If inspection or tests show defects, such defective work or material shall be replaced and inspection and tests repeated at no additional cost to Owner. Make tight any leaks. Repeat tests until system is proven tight. Caulking of leaks will not be permitted.
 - 3. All equipment not capable of withstanding the test pressure shall be valved off during test.
 - 4. Provide all gauges, valves, caps and accessories to properly test system.
 - 5. At no time shall a system be tested at a pressure greater than the piping system or component is rated.
- B. Refrigerant Pipe:
 - 1. Refrigerant piping shall be tested in accordance with the equipment manufacturer's recommended pressure.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. All joints and equipment shall be leak tested using a halide or electronic leak detector.
3. The test shall be for the length of time recommended by the manufacturer or thirty minutes, whichever is greater, without leakage.

2.5 SYSTEM START-UP:

A. General:

1. System shall be started and checked to ensure safe and proper operation.
2. Minimum requirements are listed for each system and are in addition to manufacturer start-up requirements and the requirements stated in the specific sections of the specifications.
3. Temperature control systems installed complete and operable.
4. Proper thermal overload protection in place for electrical equipment.

B. Air Systems:

1. Verify proper fan rotation.
2. Verify full load amps are below nameplate amps.
3. Verify clean filters are installed.

PART 3 - EXECUTION

3.1 SUBMITTALS:

A. Submit to the A/E all test results including a minimum of the following information:

1. System tested
2. Location of test
3. Date, time, and ambient temperature at test startup and completion
4. Persons present for test
5. Duration of test
6. Test equipment
7. Test results

B. Reports shall include but not be limited to:

1. Equipment start-up reports

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

C. Reports shall be submitted within ten days of test completion.

3.2 ENGINEER REVIEW:

A. The A/E shall, at his discretion, recheck any or all of the test work. Provide ample number of technicians and test equipment to perform the tests required.

B. All systems not accepted shall be retested.

C. Systems shall be retested and rechecked until accepted by all parties.

END OF SECTION

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the testing and balancing of all mechanical systems where shown on the drawings and specified hereinafter.

B. Description:

1. Systems shall include all equipment, operators, controls, accessories, and appurtenances.
2. These systems shall include:
 - a. Air systems (heating and air conditioning systems)

1.2 RELATED DOCUMENTS:

A. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0592 - System Start-Up

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following (latest editions):
 - a. AABC National Standards
 - b. NEBB Standards
2. Testing and balancing shall be performed by an agency certified by the AABC or NEBB.
3. All technicians shall have a minimum of three years testing and balancing. Each test and adjustment shall be under the direct supervision of a qualified technician.
4. Testing and balancing shall be performed by one agency.

PART 2 - PRODUCTS

2.1 GENERAL BALANCING PROCEDURES:

- A. All recorded data shall represent a true, actually measured, or observed condition.
- B. The Test and Balance Agency shall leave all system components in proper working order including:
 - 1. Close doors to electrical switch boxes.
 - 2. Restore thermostats to specified settings.
- C. Systems shall be tested in each specified mode of operation. See equipment Sequence of Operation.

2.2 INSTRUMENTS:

- A. All Test and Balance work shall be performed using the required instrumentation to obtain proper measurements.
- B. Instruments shall be properly maintained and transported in such a manner as to provide protection against damage due to vibration, impact, moisture or any other condition that may render them inaccurate.
- C. Instruments shall have been calibrated within a period of six months prior to starting the project.
- D. Proof of calibration shall be maintained with the instruments.
- E. Instruments shall be calibrated upon completion of the work when required by the client to prove reliability.

2.3 TEMPERATURE MEASUREMENT:

- A. Provide supply air temperatures for each piece of equipment with cooling coils or heating coils.
- B. Temperature measurements at the following devices shall be provided only downstream of the device:
 - 1. Ductless split systems
 - 2. Unit heaters

PART 3 - EXECUTION

3.1 COMPLETION:

- A. Upon completion of work, submit three copies of the Test and Balance report.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.2 COORDINATION OF WORK:

- A. Test and Balance Agency shall not begin work on a system until system is started as required in SYSTEM START-UP specifications.

END OF SECTION

SECTION 23 0700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of insulation required for thermal and acoustical installation on all mechanical piping and appurtenances where shown on the drawings and specified hereinafter under applicable sections of this specification.

1.2 RELATED DOCUMENTS:

A. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0719 - HVAC Piping Insulation

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All insulation materials must have a maximum 25/50 flame/smoke rating as tested by ASTM E-84, NFPA 255 and UL 723 except where specifically noted otherwise.
2. OSHA
3. Flame/smoke rating shall be minimum 25/250 in equipment rooms where the room is not used as a plenum.

B. Insulation thickness shall equal those recommended by ASHRAE 90.1 or as scheduled, whichever is greater. Surface temperatures shall be below 140 degrees F.

C. Accessories such as adhesives, mastics, cements, and tapes for fittings shall have the same component rating as listed above.

D. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed requirements. Treatment of jackets or facing to impart flame and smoke safety shall be permanent. The use of water soluble treatments is prohibited.

E. Installation and materials shall meet the requirements of the International Building Codes.

F. All insulation work shall be applied by mechanics normally employed in the trade. All insulation shall be installed in accordance with the manufacturer's recommendations.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- G. All insulation furnished under this Division of the specifications shall be the product of one manufacturer except for special applications.
- H. Manufacturers:
 - 1. The following manufacturers of sealants, adhesives, and mastics shall be:
 - a. Foster

PART 2 – PRODUCTS

2.1 MASTICS, SEALANTS, AND ADHESIVES:

- A. General:
 - 1. Materials shall be as recommended by the insulation manufacturer.
 - 2. Products shall be applied as recommended by the manufacturer for that specific application.
 - 3. Materials shall meet LEED requirements for low emitting products.
- B. Finish:
 - 1. When material is applied where it is to be painted, the material shall be coated, if necessary, to allow the material to be properly painted with use of special paints or primers.

PART 3 - EXECUTION

3.1 GENERAL:

- A. All insulation materials shall be delivered and stored in manufacturer's container and kept free from dirt, water, chemical and mechanical damage.
- B. Insulation shall be applied by experienced workmen in a workmanlike manner.
- C. Insulation shall not be applied until all pressure testing has been completed, inspected and released for insulation application.
- D. Surfaces to be insulated shall be clean and dry.
- E. All insulation joints shall be butted firmly together and all jackets and tapes shall be smoothly and securely installed.
- F. Insulation shall be run continuously through walls and sleeves.

3.2 INSTALLATION:

- A. General:
 - 1. Insulation on cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

END OF SECTION

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the installation of insulation required for thermal and acoustical installation on all piping.

1.2 RELATED DOCUMENTS:

A. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0700 - HVAC Insulation

1.3 QUALITY ASSURANCE:

A. Manufacturers:

1. The following elastomeric pipe insulation manufacturers are acceptable:
 - a. Armacell
 - b. K-Flex
2. The following aluminum jacket manufacturers are acceptable:
 - a. Childers
 - b. RPR Products

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Pipe insulation shall comply with the International Energy Conservation Code or these specifications, whichever is greater.
- B. Insulation outside and in mechanical rooms not used as return air plenums shall have a maximum 25/450 flame/smoke rating..

2.2 TYPES OF INSULATION:

A. Elastomeric Insulation:

1. General:

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- a. The insulation shall have a factory applied adhesive closure system.
2. Physical properties:
 - a. Thermal conductivity (k) is .27 at 75 degrees F.
 - b. Water transmission is .08 perms – inch.
 - c. Will not significantly contribute to fire.
3. Insulation shall be:
 - a. Armacell type AP Armaflex or type AP/SS

2.3 PIPE INSULATION APPLICATION:

A. General:

1. All fittings and accessories in the piping system shall be insulated similar to the piping system.

2.4 JACKETING:

A. Aluminum Jacketing:

1. General:
 - a. Jacketing shall be manufactured from Type 1100, 3003, 3105 and 5005 alloys.
 - b. Jacketing on piping shall be corrugated. Corrugation shall be 3/16 inches.
 - c. Jacketing on equipment shall be smooth.
2. Thickness:
 - a. Pipe jacket shall be .020 inches.
 - b. Equipment jacket shall be .024 inches.
3. Vapor Barrier:
 - a. Continuous lamination to jacket.
 - b. Three (3) mil polyethylene film with 40 lb. virgin kraft paper.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.5 FINISH:

A. Outdoor Piping and Accessories:

1. Aluminum jacketing

2.6 ADDITIONAL INSULATION REQUIREMENTS:

A. Liquid Refrigerant Lines:

1. Insulate liquid refrigerant lines similar to suction refrigerant lines in the following systems:
 - a. Ductless split systems
 - b. Where required by equipment manufacturers

PART 3 - INSULATION THICKNESS SCHEDULES

3.1 GENERAL:

- A. Specific insulation requirements may be indicated elsewhere in these specifications or on the contract drawings.
- B. Insulation for piping exposed to ambient conditions based upon 90 degrees F, 90% RH, and 7 MPH wind speed.

3.2 ELASTOMERIC INSULATION SCHEDULE:

- A. Refrigerant Suction Lines, Hot Gas Reheat Lines, and Liquid Lines:
 1. All pipe - 1½" thk.
- B. Condensate Drains (not outdoors):
 1. Up to 2" pipe – ¾" thk.

PART 4 - EXECUTION

4.1 INSTALLATION:

- A. Apply adhesives, sealants, coatings, and other materials as recommended by the manufacturer.
- B. All penetrations through vapor barrier shall be sealed with vapor barrier sealer. Where metallic jacketing is used, all penetrations through jacket and at termination of jacket shall be sealed.
- C. Butt joints and seams of elastomeric insulation shall be sealed with contact adhesive as recommended by the insulation manufacturer. Where possible, insulation shall be used without slitting and slipped over tubing. All fittings shall

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

be covered and sealed with fabricated pieces of the same insulation and adhesive.

4.2 ANCHORS AND SUPPORTS:

- A. Anchors and supports that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.
- B. Jacketing shall be carried through hanger on inside of 16 gauge sheet metal shields and sealed to maintain continuous vapor barrier.

4.3 METALLIC JACKETING:

- A. Jacketing shall be held in place with a friction type, Z lock, or 2" overlap joint. Joints shall be completely sealed along the longitudinal seam and shall be installed to shed water. Circumferential joints shall be sealed by use of 2" wide butt strips. 1/2" bands shall secure jacketing. Space as recommended by the manufacturer.
- B. Straps shall secure jacket. Straps shall be the same material as jacket. Provide 1/2" straps for jackets up to 12" in diameter. Provide 3/4" straps for 14" and larger diameter jackets.

4.4 MULTI-LAYER INSTALLATION:

- A. Joints shall be staggered.

END OF SECTION

SECTION 23 0900 - INSTRUMENTATION AND CONTROLS FOR HVAC (GENERAL)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of the building environmental controls shown on the drawings and specified hereinafter.

B. Description:

1. Control and instrumentation work shall include:
 - a. Temperature control

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All environmental controls shall comply with all local codes and ordinances, and meet or exceed the following standards:
 - a. Underwriters Laboratories
 - b. NEMA Standards
 - c. National Electric Code
 - d. Scientific Apparatus Makers Associates Standard PMC 20.1 for Process Measurement and Control Terminology
 - e. Scientific Apparatus Makers Associates Standard PMC 20.2 for Process Control Performance
 - f. NFPA 90A

- B. Control circuit wiring shall meet NFPA Standard 70, Article 725, for remote control, low energy power, low voltage power and signal circuits.

PART 2 - PRODUCTS

2.1 SYSTEM:

- A. Provide all thermostats, sensors, transmitters, conduit, wiring, accessories and appurtenances.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- B. Provide switches, fuses, disconnects and all other devices necessary for protection and convenient operation of system.

2.2 ELECTRIC/ELECTRONIC CONTROLS:

A. General:

1. All control conduit, wires, and control devices shall be furnished and installed under this division.
2. All control wiring shall be run in conduit.
3. Conduit shall be provided in accordance with the Electrical Division of this specification unless noted otherwise in these specifications.

B. Wiring:

1. Wiring for low voltage circuits generally shall be No. 18B and S gauge or larger RSH-2 heat resistant.
2. Cables of two or more conductors, not smaller than 22 B and S gauge if shielded or No. 18 B and S gauge if not shielded, may be used for low voltage d-c and electronic circuits carrying less than 1.50 amperes, in lieu of individual wires.
3. Cables carrying a-c circuits sensitive to external fields shall be shielded.
4. Cables having fewer than 12 conductors shall have thermoplastic or rubber insulation for 300 volts or more and a heavy outer braid or thermoplastic sheath. Shields shall be grounded to building's grounding system, using wire not smaller than No. 14 B and S gage. Shields shall not be grounded to conduit systems or building piping.
5. Cables shall terminate in solder or screw type terminal strips.
6. Cables shall not be tapped at intermediate points.
7. All wires, whether individual or in cables, shall be color coded and numbered for identification in accordance with the National Electric Code.
8. Where wire is not in conduit, such as termination at equipment, etc., all exposed wire shall be plenum rated.

C. Transformers:

1. Transformers shall be furnished and installed for supplying current to control equipment as required. Transformers shall conform to NEMA standards, shall be capable of supplying 125 percent the connected load, shall be enclosed in U.L. listed cabinets, ventilated, with conduit connections, and provided with fused disconnect switches on primary side and on secondary side.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

D. Terminals:

1. All terminal strips shall be numbered.

2.3 THERMOSTATS:

A. Thermostats:

1. Thermostats shall have minimum adjustable operating range of 20 degrees F above and below design setpoint.
2. Wall mounted room thermostats shall be without thermometer and with setpoint indicator.
3. Thermostat shall have external adjustments with internal stops for minimum and maximum settings.

PART 3 - EXECUTION

3.1 THERMOSTATS:

A. General:

1. Install all devices as recommended by manufacturer.

B. Installation:

1. Mount control device 4'-0" above finished floor to top of device's control mechanism unless noted otherwise.

END OF SECTION

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

SECTION 23 2113 - HVAC PIPING (GENERAL)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of pipe, pipe fittings, accessories and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

- A. All sections of Division 23 Specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All pipe and pipe fittings shall comply with American National Standards Institute Code, all local codes and ordinances, and meet or exceed the standards and procedures (latest editions) of the following:

a. Non-Ferrous Metallic Pipe and Fittings:

- 1) Copper Tube, Water, Seamless, Types K, L, and M. ASTM B88
- 2) Pipe Fittings, Brass or Bronze, 125 and 250 lbs., Cast or Wrought. ANSI B16.15
- 3) Solder Joint Fittings, Pressure, Copper Alloy. ANSI B16.22
- 4) Refrigerant Piping. ANSI B31.5, ANSI B36.40, ASTM A333
- 5) Copper tube (drain, vent) DWV. ASTM B306
- 6) Copper tube (refrigeration), ACR. ASTM B280

b. Pipe Joining Materials, Gaskets, Methods, and Accessories:

- 1) Soldering and brazing ANSI B9.1

B. Material shall be new domestic materials (made in the USA) of standard manufacture suitable for specified use.

- C. Manufacturer shall certify materials conform to reference specifications, or specification number shall be cast into or marked on each piece.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

D. Manufacturers:

1. The following solder manufacturers are acceptable:
 - a. United Wire
 - b. Engelhard
 - c. Elkhart

PART 2 - PRODUCTS

2.1 GENERAL:

- A. No materials shall be co-mingled within the same system except those which are specifically approved in these specifications.

2.2 PIPE SCHEDULE:

A. Cooling Coil Condensate Drain Piping:

1. Schedule 40 PVC.

B. Refrigerant Piping:

1. Piping shall be seamless hard drawn, Type L, copper pipe. Piping below ground shall be Type K. Copper tubing with O.D. of 1/4" and 3/8" shall have minimum nominal wall thicknesses of .030" and .032" respectively.
2. Piping up to 1-3/8" can be seamless soft drawn, Type L, copper pipe, ASTM BS280, where permitted by the equipment manufacturer.
3. Piping shall be dehydrated, charged with nitrogen, and capped.

2.3 FITTINGS AND CONNECTIONS:

A. Copper Pipe Fittings - Refrigerant Service:

1. Fittings shall be wrought copper.
2. Solder used in fittings shall be a 45% silver alloy. Phosphorous alloys are not acceptable.
3. All joints shall be brazed.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Pipe shall be installed in strict accordance with manufacturer's recommendations.
- B. Cut pipe accurately to measurements established at building or site, and work into place without springing or forcing, properly clearing all window, doors, and other openings or obstructions. Excessive cutting or other weakening of building to facilitate piping

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

installation will not be permitted. Piping shall line up flanges and fittings freely and shall have adequate unions and flanges so that all equipment can be disassembled for repairs.

- C. Each length of pipe, as erected, shall be supported and capped. Dirt and all foreign matter shall be cleaned from pipe and fittings before installation.
- D. All turns and connections shall be made with long radius fittings as specified hereinafter.

3.2 REFRIGERANT PIPE:

- A. Cut refrigerant pipe with wheel cutter only. Do not saw or ream.

3.3 PIPE INSPECTION:

- A. The Owner and A/E reserve the right to inspect, sample, and test any pipe after delivery and to reject all pipe represented by any sample which fails to comply with the specified requirements. Inspection of pipe shall be for pits, blisters, rough spots, breakage, or other imperfections. Any pipe which has been rejected because of the above shall be conspicuously identified and immediately removed from the construction site.

3.4 DRAINAGE PIPING:

- A. Provide cleanouts at all changes of direction totaling 90 degrees or more.

END OF SECTION

SECTION 23 9005 - HEAT TRANSFER (ELECTRIC COOLING)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of heat transfer equipment and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0502 - Common HVAC Materials

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following as referenced (latest editions):
 - a. ARI Standards 210/240, 340, and 360
 - b. ANSI Z21.47/UL - Unitary Air Conditioning Standard for Safety Requirements
 - c. Underwriter's Laboratory
 - d. NFPA 90A
 - e. AMCA 210 Test Code For Air Moving Devices
 - f. National Electric Code
 - g. ASHRAE 15 - Safety Code for Mechanical Refrigeration

B. All motors and equipment shall be U.L. labeled.

C. All insulation and materials shall have a flame spread rating of less than 25 and smoke developed of less than 50.

D. All heating and cooling equipment shall bear the ARI seal.

E. All coils shall be ARI certified.

F. All outdoor cabinets shall meet or exceed the 500 hour salt spray test unless more stringent tests are specified.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

G. Manufacturers:

1. The following ductless split system cooling unit manufacturers are acceptable:
 - a. Mitsubishi
 - b. Daikin
 - c. LG

PART 2 - PRODUCTS

2.1 GENERAL:

A. General:

1. Equipment shall meet or exceed the scheduled efficiencies or ASHRAE 90.1, whichever is greater.
2. Furnish and install heating and cooling units in accordance with the drawings and as specified hereinafter.
3. Unit shall be factory assembled and tested.
4. Provide all controls and accessories for a complete operating system including but not limited to:
 - a. Crank case heater
 - b. Start capacitor kit (single phase condensers)
5. Refrigerant shall be R410A.

B. Outdoor Cabinets:

1. Unit shall be designed for outdoor installation.
2. Cabinet shall be insulated and constructed of heavy duty galvanized steel. Frame and panels shall be 18 gauge minimum. They shall be zinc coated or epoxy coated with a baked-on finish.
3. Prewired control panel.

C. Refrigerant Circuits:

1. All units shall have factory installed liquid line filter dryer, liquid line sight glass, pressure tap ports, check valves, and suction and liquid service valves.
2. Where low ambient control is required, electronic head pressure control shall be provided.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

D. Compressors (up to 7 tons):

1. Compressor shall have centrifugal oil pump.
2. Motor shall have internal temperature and current sensing motor.
3. Compressor shall have totally dipped hermetic motor windings.
4. Compressor shall be resiliently mounted and seismically isolated.

E. Outdoor Coil:

1. The outdoor coil shall be constructed of aluminum spine fin mechanical bonded to seamless aluminum or copper tubing with all joints brazed.
2. Surface shall be engineered to facilitate defrost water runoff.
3. Louvered panels.

F. Indoor Coil:

1. The indoor coil shall be constructed of aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.
2. Coil shall include factory installed refrigerant metering device and refrigerant line fittings.

G. Outdoor Fans:

1. Fan motors shall be permanently lubricated, weatherproof motors suitable for outdoor use.
2. Motor shall have built-in current and thermal overload protection.
3. Fans shall be resiliently mounted and seismically isolated.
4. Fans shall be statically and dynamically balanced.
5. Provide PVC coated fan guard.

H. Safeties

1. Provide a time-guard device to prevent compressor recycling by requiring a 5-minute delay before restarting.

2.2 SPLIT SYSTEM UNITS (DUCTLESS):

A. Controls:

1. Provide a control wiring terminal board in the outdoor unit to match the indoor unit terminal board and thermostat terminals.
2. Airflow switch interlocked with condenser operation.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3. Hard wired thermostat.

B. Filters:

1. Washable filter

PART 3 - EXECUTION

3.1 WARRANTY:

A. Compressor Failure:

1. When a compressor fails within the warranty period, the compressor shall be replaced.

END OF SECTION

SECTION 23 9006 - HEAT TRANSFER (ELECTRIC HEATERS)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of electric heaters and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All sections of Division 23 Specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following as referenced (latest editions):
 - a. Underwriters Laboratory
 - b. NFPA 90A
 - c. AMCA 210 Test Code For Air Moving Devices
 - d. National Electric Code

B. All motors and equipment shall be U.L. labeled.

C. All electric heaters shall have impedance protection per UL519.

D. Manufacturers:

1. The following electric heater manufacturers are acceptable:
 - a. Trane
 - b. Berko
 - c. Markel
 - d. Reznor
 - e. Airtherm

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- f. Raywall
- g. Q-Mark
- h. Reddi

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Equipment shall meet or exceed the scheduled efficiencies or ASHRAE 90.1, whichever is greater.

2.2 ELECTRIC UNIT HEATERS:

A. Casing:

- 1. All metal surfaces shall be corrosion resistant and finished in baked enamel.
- 2. Horizontal unit heaters shall have louver panel rotatable thru 360 degrees.

B. Controls:

- 1. Provide transformer for fan and control circuit.
- 2. Provide a wall mounted thermostat.
- 3. Thermal protection shall shut unit off in event of overheating with automatic reset.

C. Motors:

- 1. Motors shall be totally enclosed, thermally protected, with sleeve or ball bearings, continuous heavy-duty type, and all angle operation.

D. Fan:

- 1. Fan shall be dynamically balanced.

E. Accessories:

- 1. Wall mounted bracket.

PART 3 - EXECUTION

3.1 ELECTRIC UNIT HEATERS:

- A. Louvers shall be adjusted for optimal airflow pattern.

END OF SECTION

SECTION 26 0500- ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL CONDITIONS

1.1 WORK INCLUDED:

- A. The work covered under these sections of the specifications consists of furnishing all labor, equipment, supplies and materials, and of performing all operations, including cutting, channeling, chasing, excavating and backfilling necessary for the installation of complete wiring systems, raceways, wiring, and electrical equipment in accordance with this section of the specifications and the accompanying drawings.
- B. The Electrical Work shall include, but not be limited to, the following:
 - 1. Circuit breakers and electrical equipment
 - 2. Raceway system
 - 3. Conductors and cables
 - 4. Wiring devices
 - 5. Safety/Disconnect Switches
 - 6. Panelboards & Circuit Breakers
 - 7. Dry Type Transformers
 - 8. Fire Alarm System
 - 9. Lighting fixtures

1.2 RELATED WORK:

- A. Related work to Divisions 26 & 28:
 - 1. The provisions, conditions, and requirements preceding and including general and supplemental conditions apply to and are a part of Divisions 26 & 28.

1.3 DEFINITIONS:

- A. Provide: Furnish and install complete ready for use, including all accessories required for operation.
- B. Furnish: Purchase and deliver to the project site complete with every necessary appurtenance, support and accessories required for operation.
- C. Install: Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project.

1.4 DESCRIPTION OF SYSTEMS:

- A. Furnish and install all materials for systems, resulting upon completion, in functioning systems in compliance with performance requirements specified. The omission of express reference to any parts necessary for or reasonably incidental to a complete installation shall not be construed as a release from furnishing such parts.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- B. The wiring specified and shown on the drawings is for complete and workable systems. Any deviations from the wiring shown due to a particular manufacturer's requirements shall be made at no cost to either the contract or to the Owner. Changes in electrical service to equipment due to substitutions of equipment by any Divisions of this specification shall be at no additional cost to the Owner.

1.5 QUALITY ASSURANCE:

- A. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. All equipment shall bear labels attesting to Underwriters Laboratories approval where subject to Underwriters Laboratories label service.

1.6 REQUIREMENTS OF REGULATORY AGENCIES/CODE COMPLIANCE:

- A. Contractors shall submit all items necessary to obtain all required permits to the appropriate Regulatory Agencies, obtain all required permits, and pay all required fees.
- B. All work shall conform to the following Codes:
 - 1. National Electrical Code (NEC-2011)
 - 2. National Electrical Safety Code (NESC)
 - 3. International Building Code (IBC-2012)
 - 4. National Fire Protection Association (NFPA)
 - 5. National Fire Alarm and Signaling Code (NFPA-72-2010)
- C. All work shall conform to all federal, state and local ordinances.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS:

- A. All requests for substitutions shall be submitted so as to be received by the Architect/Engineer at least 10 calendar days before bid date. Approved substitutions will be issued in an addendum.

PART 3 – EXECUTION: N/A

END OF SECTION

SECTION 26 0501 - ELECTRICAL COORDINATION

PART 1 - GENERAL CONDITIONS

1.1 INTERPRETATION OF CONTRACT DOCUMENTS:

- A. This section of the specifications and related drawings describe general provisions applicable to every section of Divisions 26 & 28.
- B. Attention is directed to Instructions to Bidders which are binding in their entirety on this portion of the work in particular to paragraphs concerning materials, workmanship and substitutions.
- C. Drawings and general provisions of Contract, including General and Supplementary Conditions, apply.

1.2 EXISTING CONDITIONS:

- A. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work, working conditions, verify all dimensions in the field, advise the Architect/Engineer of any discrepancy, and submit shop drawings of any changes he proposes to make, in quadruplicate for approval, before starting the work. Contractor shall install all equipment in a manner to avoid building interference.

1.3 SHOP DRAWINGS:

- A. The Contractor shall not purchase any materials or equipment prior to receipt of approved shop drawings.
- B. Prior to assembling or installing the work, prepare and submit shop drawings for the following items of equipment:
 - 1. Circuit breakers and Electrical Distribution Equipment
 - 2. Wiring Devices
 - 3. Fire Alarm System
 - 4. Lighting Fixtures
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Engineer to ascertain that the proposed equipment and materials comply with specification requirements.
- D. Shop drawing sets shall be suitably bound and indexed. Loose sheets are not acceptable.
- E. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted. Items of the submittal **that have been "faxed" are not** acceptable.
- F. Before preparing drawings, Contractor shall consult all contract drawings and specifications in detail, obtain manufacturer's recommended installation

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

instructions, and have shop drawings prepared based on specific equipment and material intended for installation. A principal of the contracting firm shall sign all shop drawings (indicating conformance with plans and specifications) before submission

- G. Approval on shop drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing (and in letter form) called attention to such deviations at the time of submission and secured written approval; nor shall it relieve him from responsibility for errors in shop drawings or schedules.
- H. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1.4 RECORD DRAWINGS:

- A. The Contractor shall keep a "red lined" set of as-built drawings on the job and, as construction progresses, shall show the actual installed location of all items, material, and equipment on these drawings.
- B. At the time of final inspection, one corrected set of the Contractor's "red-lined" as-built drawings shall be delivered to the Engineer for creating the Owner's record drawings. If any discrepancies are found by the Owner/Engineer, they shall be corrected by the Contractor and resubmitted.
- C. Once the Owner & Engineer deem that the Contractor's as-built drawings are accurate and correct, the Engineer shall retain the as-built drawings and incorporate the "red-lined" changes, through CADD, into a record set of drawings. The Engineer shall provide the Owner with the following:
 - 1. The Contractor's copy of "red-lined" as-built drawings
 - 2. One set of reproducible record drawings
 - 3. One "black-line" copy of the record drawing
 - 4. A CD-ROM containing all CADD files of the record drawings.

1.5 OWNER'S MANUAL: N/A

1.6 OPERATING AND MAINTENANCE INSTRUCTIONS: N/A

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION:

- A. Nameplates shall be laminated phenolic resin with a white core and engraved lettering (or acrylic), a minimum of 1/4-inch high. Nameplates that are furnished by manufacturer, as a standard catalog item, or where other methods of identification is herein specified, are exceptions.
- B. Equipment requiring nameplates:
 - 1. Panelboards

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. Dry Type Transformers
 3. Safety/Disconnect Switches
 4. Elevator car power and lighting disconnects: Provide labels for elevator car power disconnects and elevator car lighting disconnects for power source information (see notes on the drawings for additional labeling information).
 - a. Provide new nameplates for all elevator disconnects (including existing car lighting disconnects).
 - b. Provide industry standard "WARNING" stick-on labels on all elevator car power disconnects in accordance with ANSI/ASME A17.1 - Safety Code for Elevators and Escalators. **Obtain labels through the elevator vendor.**
 - c. Nameplates for all elevator car power disconnects connected to emergency power shall be **red**.
 - d. Nameplates for all elevator car power disconnects connected to normal power shall be **black**.
 - e. Nameplates for elevator car lighting disconnects shall be **red**.
 5. Elevator car circuit breaker for Elevator #1 in panel PHE:
 - a. New labeling is not required. PHE is a standard panelboard with Elevator #1 presently labeled on panelboard index.
 6. Elevator car circuit breaker for Elevator #3 in panel PHA:
 - b. Provide new Elevator #3 nameplate.
 7. Elevator car circuit breaker for Elevator #2 in panel PHA.
 - c. Remove existing Elevator-#2 nameplate and provide new Elevator #2 nameplate.
 - d. Match existing Elevator #3 nameplate style and font.
- C. Provide industry standard "WARNING" stick-on labels on all elevator car power disconnects in accordance with ANSI/ASME A17.1 - Safety Code for Elevators and Escalators. **Obtain labels through the elevator vendor.**

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

- A. Inspection:
 1. Prior to any Work, the Contractor shall carefully inspect the installed Work of all other Trades and verify that all such Work is complete to the point where his installation may properly commence.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. Verify that all equipment may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect Engineer.
2. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.2 INSTALLATION:

- A. Install all equipment in strict accordance with the manufacturer's recommendations and the shop drawings. Secure equipment using fasteners suitable for the use, materials, and loads encountered. If requested, submit evidence proving suitability. Do not attach electrical materials to roof decking, removable or knockout panels, or temporary walls and partitions, unless indicated otherwise.
- B. Working spaces shall be not less than specified in the National Electrical Code for all voltages specified.

3.3 COORDINATION WITH EXISTING CONDITIONS:

- A. Coordinate all work of each section with existing conditions to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings, and shall make sure that proposed equipment can be accommodated. If interferences occur, Contractor shall bring them to the attention of Architect/Engineer, in writing, prior to signing of contract; or, Contractor shall, at his own expense, provide proper materials, equipment, and labor to correct any damage due to defects in his work caused by such interferences.

3.4 WORK PERFORMANCE:

- A. New work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior condition.
- B. Where conduits, wireways, busduct, and other electrical raceways pass through fire partitions, fire walls or walls and floors, install a firestop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, and completely fill clearances between raceways and openings. Installation of fire-stop material shall conform to Section 26 0503 FIRESTOPPING, PATCHING AND REPAIR.

3.5 CONNECTION OF EQUIPMENT FURNISHED AND INSTALLED UNDER OTHER DIVISIONS OF THE WORK:

- A. This Contractor shall rough-in and make final electrical connection to all pieces of equipment requiring electrical connections. Such equipment being furnished and installed under other Divisions of the Work, including but not limited to the following:
 1. Elevator equipment

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. HVAC equipment

- B. This Contractor shall provide whatever incidental devices are necessary for final connection, such as, but not necessarily limited to outlet boxes, receptacles, connectors, clamps and switches.

END OF SECTION

SECTION 26 0502 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SCOPE:

- A. This section describes the electrical demolition work to be done to existing facilities.
- B. The term demolition, as used in this specification, shall mean any and all removal of electrical equipment as shown on the demolition plans or as described herein.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. All other Division 26000 sections.

1.3 WORK INCLUDED:

- A. The work under this section consists of furnishing equipment, performing labor and services necessary for the demolition and removal of the electrical system shown on the drawings and hereinafter noted.

1.4 SALVAGED MATERIALS:

- A. The Owner shall have priority for the selection of salvaged material and equipment. Any equipment and material selected to remain the property of the Owner shall be removed and delivered to a location on the site as designated by the Owner. Material and equipment not retained by the Owner shall become the property of the Contractor and shall be removed from the site by him.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Verify field measurements and circuiting arrangements prior to commencement of work.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.2 PREPARATION:

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- C. Reconnect existing circuits and services interrupted by demolition.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK:

- A. Remove abandoned wiring to source of supply.
- B. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- C. Repair adjacent construction and finishes damaged during demolition and extension work.

END OF SECTION

SECTION 26 0503 – FIRESTOPPING, PATCHING AND REPAIR

PART 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK:

- A. Cutting: Furnish all labor, materials, tools and equipment and perform all operations in connection with the cutting of new and existing building structure, finishes and building assemblies as specified hereinafter.
- B. Patching: Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of watertight sealant as required to seal voids or gaps around Division 26000 equipment at penetrations through exterior floors, walls, and roof systems.
- C. Repair: Furnish all labor, materials, tools and equipment required to repair all existing or new building components and finishes, outside components, landscaping, utilities, or other appurtenances that are damaged as a result of the performance of this contract.
- D. Firestopping: Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of firestopping systems required to seal off all voids or gaps at interfaces of Division 26000 equipment, wires, cables, cable trays, sleeves, raceways and other penetrations at fire rated walls, roofs, floors, floor-ceilings, roof-ceilings and similar assemblies.
- E. All existing utilities, feeders, branch circuits, signal wiring, control wiring, etc. shall be reconnected to new or existing systems as required to maintain the same functions as existed prior to new work.

1.2 QUALITY ASSURANCE:

- A. All fill, void, and cavity firestopping materials shall be UL classified as a through-penetration Firestop System.
- B. Sealants shall equal or exceed all requirements of ASTM E-814.
- C. No penetrations through any fire rated walls, floors, roofs, floor-ceilings, or ceiling-roof assemblies will be allowed unless they are sealed with firestop systems which are included in assemblies tested in accordance with ASTM E119 and ASTM E814 for the assembly.

PART 2 - PRODUCTS

2.1 FIRESTOPPING

- A. Firestopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM E119 time-temperature rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Firestopping material shall be noncombustible as defined by ASTM E136; and in addition for insulation materials, melt point shall be a

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

minimum of 1700 degrees F or one (1) hour protection and 1850 degrees F for two (2) hour protection.

- B. The following firestopping sealant manufacturers are acceptable:
 - 1. Nelson
 - 2. Dow Corning
 - 3. Thomas & Betts
 - 4. 3M
 - 5. Hilti
- C. Materials shall be new, unused, (not more than one year old) properly stored and matching existing in colors, texture, finish, appearance and function.
- D. The firestopping compound shall be dry to the touch within 2 hours after installation but shall not set up immediately so as to allow easy working of the compound during installation.
- E. Firestopping compounds shall have a shelf life in excess of 2 years and shall be delivered to the job site and used at least 6 months prior to the expiration of its shelf life.
- F. Refer to architectural drawings for fire ratings of walls and slabs.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Patch and repair all building finishes, structural components, or other appurtenances that are damaged as a result of the performance of this contract. Patch and repair work shall include finishes, components, substructure and materials required for the installation of such work in accordance with standard practices.
- B. Patched and repaired work shall be finished to match existing or adjacent construction and conditions.

3.2 INSTALLATION OF FIRESTOPPING:

- A. For the purpose of applying this specification, fire resistive ratings are as follows:
 - 1. Elevator Equipment Room, Electrical and Mechanical Room walls: 2 hour F rating
 - 2. Building floor slabs: 2 hour F rating
 - 3. Corridor walls: 1 hour F rating

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- B. The thickness of all finished firestopping material shall meet the minimum specified for the hourly fire resistance rating of the wall, floor, floor-ceiling or ceiling-roof assembly being firestopped.

END OF SECTION

SECTION 25 0519 - WIRE AND CABLE

PART 1 - GENERAL

1.1 SCOPE:

- A. This section includes the furnishing, installation, and connection of the building wire for power circuits.
- B. Unless otherwise specified in other sections of these specifications, control wiring shall be provided, installed, and connected to perform the functions specified in other sections of these specifications.
- C. Unless otherwise specified in other sections of these specifications, communication and signal wiring shall be provided, installed, and connected to perform the function specified in other sections of these specifications.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. All other Division 26000 sections.

1.3 WORK INCLUDED:

- A. The work under this section consists of furnishing materials and equipment, performing labor and services necessary for the installation of the electrical cable and wiring system shown on the drawings and hereinafter specified.

1.4 APPLICABLE PUBLICATIONS:

- A. The following specifications and standards, except as hereinafter modified, are incorporated herein by reference and form a part of this specification to the extent indicated by the references thereto. Except where a specific date is given, the issue in effect (including amendments, addenda, revisions, supplements, and errata) on the date of Invitation for Bids shall be applicable. In text such specifications and standards are referred to by basic designation only.
 - 1. National Fire Protection Association (NFPA) Publications
 - No. 70National Electrical Code (NEC)
 - 2. Underwriters' Laboratories, Inc. (UL) Publications:
 - No. 44Rubber-Insulated Wire and Cables
 - No. 83Thermoplastic-Insulated Wires
 - No 493Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

No. 486.Wire Connectors and Soldering Lugs

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Building Wire (Power and Lighting):

1. Cable and wire shall be in accordance with UL, NEC, as shown on the drawings, and as hereinafter specified.
2. Conductors:
 - a. Shall be annealed copper.
 - b. Shall be stranded for sizes No. 8 and larger. Sizes No. 10, and smaller shall be solid.
 - c. Size shall be not less than shown on the drawings. Minimum size shall be No. 12 AWG.
3. Insulation: Unless otherwise shown on the drawings, insulation shall be as follows:
 - a. Feeders and branch circuits:
 - 1) THW - Dry, Wet Locations
 - 2) THWN - Dry, Wet Locations
 - 3) THHN - Dry, Damp Locations
 - 4) XHHW - Dry, Damp, Wet Locations
4. Color Code:
 - a. All secondary service, feeder, and branch circuit conductors shall be color coded as follows:

<u>208/120 Volt</u>	<u>Phase</u>	<u>480/277 Volt</u>
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
 - b. All No. 12 and No. 10 branch circuit conductors shall have solid color compound or solid color coating.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- c. No. 8 AWG and larger phase conductors shall have either:
 - 1) Solid color compound or solid color coating.
 - 2) Stripes, bands, or hash marks of colors specified above.
 - 3) Colored pressure-sensitive plastic tape. Tape shall be applied in half overlapping turns for a minimum of three inches for all terminal points, and in all junction boxes, pull boxes, troughs, manholes, and handholes. Tape shall be 3/4-inch wide with colors as specified above. The last two laps of tape shall be applied with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.
 - d. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.
- B. Splices and Joints:
- 1. Shall be in accordance with UL and NEC.
 - 2. Branch circuits (No. 10 AWG and smaller):
 - a. Connectors shall be solderless, screw-on, pressure cable type, 600 volt, 105 degree C, with integral insulation. They shall be approved for copper conductors, and shall be reusable.
 - b. The integral insulator shall have a skirt to completely cover the stripped wires.
 - c. The number, size, and combination of conductors as listed on the manufacturers packaging shall be strictly complied with.
 - 3. Feeder Circuits:
 - a. Connectors shall be indent, hex screw, or bolt clamp-type. Material shall be high conductivity and corrosion-resistant.
 - b. Connectors for cable sizes 250 MCM and larger shall have not less than two compression indents.
 - c. Splices and joints shall be insulated with materials approved for the particular use, location, voltage, and temperature. Insulation shall be not less than that of the conductors being joined.
 - d. Plastic electrical insulating tape:
 - 1) Tape shall be flame retardant, cold and weather resistant.
- C. Control and signaling circuit wiring:
- 1. Unless otherwise specified in other sections of these specifications, control wiring shall be as specified for power and lighting wiring.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. Wire size shall be large enough so that the voltage drop under inrush conditions will not adversely affect operation of the controls.
- D. Wire Lubricating Compound shall be suitable for the wire insulation and conduit it is used with, and shall not harden or become adhesive.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Installation shall be in accordance with the NEC, as shown on the drawings, and as hereinafter specified.
- B. All wiring shall be installed in raceway systems, except where direct burial is shown on the drawings.
- C. Cables and wires shall be spliced only in outlet boxes, junction boxes, pull boxes, manholes, or handholes.
- D. Cable supports shall be installed for all vertical feeders in accordance with the NEC. They shall be of the split wedge type which firmly clamps each individual cable and tightens due to cable weight.
- E. For panelboards, cabinets, wireways, switches, and equipment assemblies, neatly form, train, and tie the cables in individual circuits.
- F. Cable and wire entering a building from underground shall be sealed between the wire and conduit, where the cable exits the conduit, with a nonhardening approved compound.
- G. Wire Pulling:
 1. Suitable installation equipment shall be provided to prevent cutting or abrasion of conduits during pulling of feeders.
 2. Ropes used for pulling feeders shall be made of suitable nonmetallic material.
 3. Pulling lines for feeders shall be attached by means of either woven basket grips or pulling eyes attached directly to the conductors.
 4. All cables to be pulled in a single conduit shall be pulled in together.

3.2 SPLICE INSTALLATION:

- A. Splices and terminations shall be mechanically and electrically secure.
- B. Where the Engineer determines that unsatisfactory splices or terminations have been installed, the device shall be removed and approved devices properly installed shall be provided at no additional cost to the Owner.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.3 FEEDER IDENTIFICATION:

- A. In each handhole, pullbox and junction box, install metal tags on each circuit cable and wire to clearly designate their circuit identification and voltage.
- B. In handholes, tags shall be of the embossed brass type, and shall also show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.4 FIELD TESTING:

- A. Feeders and branch circuits shall have their insulation tested after installation and before connection to utilization devices such as fixtures, motors, or appliances.
- B. Test shall be performed by megger and conductors shall test free from short-circuits, grounds, and opens.
- C. Conductors shall be tested phase-to-phase and phase-to-ground.

END OF SECTION

SECTION 26 0526 - GROUNDING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section includes the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounding systems.
- B. The term ground, as used in this specification, shall mean any or all of the grounding types specified.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. All other Division 26000 sections.

1.3 QUALITY ASSURANCE:

- A. NEC Compliance: Comply with NEC requirements as applicable to materials and installation of electrical grounding systems, associated equipment and wiring. Provide grounding products which are UL listed and labeled.
- B. UL Compliance: Comply with applicable requirements of UL Standards Nos. 467 and 869 pertaining to electrical grounding and bonding.
- C. IEEE Compliance: Comply with applicable requirements of IEEE Standard 142 and 241 pertaining to electrical grounding.

PART 2 - PRODUCTION

2.1 GENERAL:

- A. Provide electrical grounding systems with assembly of materials, including cables/wires, connectors, terminals, solderless lugs, grounding rod/electrodes, bonding jumper braid and additional accessories needed for complete installation. Where materials or components are not indicated, provide products complying with NEC, UL, IEEE and established industry standards.

2.2 GROUNDING CONDUCTORS:

- A. Shall be UL and NEC approved types, copper, with THWN insulation color identified green, except where otherwise shown on the drawings, or specified.
- B. Wire size shall not be less than #12 AWG and not less than required by the NEC.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.3 GROUNDING CLAMPS:

- A. Clamps for connection of grounding electrode conductors to ground rods or metal piping 1" and less in diameter shall be cast brass/bronze and of the single screw type design.
- B. Clamps for bonding of metal piping for 1" through 6" in diameter shall be bronze or brass and of the U-bolt type.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL GROUNDING:

- A. General: Install electrical grounding systems in accordance with applicable portions of NEC, with NECA's "Standard of Installation," and in accordance with recognized industry practices to ensure that products comply with requirements and serve intended functions.
- B. Coordinate with other electrical work as necessary to interface installation of electrical grounding system with other work.
- C. Weld grounding conductors to underground grounding rods/electrodes.
- D. Install clamp-on connectors only on thoroughly cleaned metal contact surfaces, to ensure electrical conductivity and circuit integrity.

3.2 FEEDERS AND BRANCH CIRCUITS:

- A. Install green insulated equipment grounding conductors with all feeders and branch circuits. Conductors shall be sized in accordance with NEC Article 250.122.

3.3 EQUIPMENT GROUNDS:

- A. All equipment that has electrical connections (lights, receptacles, panels, and utilization equipment) shall have a ground wire connected that is directly tied to the ground bus of the panel which serves it.
- B. Fixed electrical appliances and equipment shall have a ground lug installed and provided by this contractor for termination of the green ground conductor.

3.4 CONDUCTIVE PIPING:

- A. Bond all conductive piping systems to the electrical system ground. Bonding connections shall be made as close as practical to the water pipe ground or service equipment ground bus.

3.5 GROUND ROD INSTALLATION:

- A. Install per manufacturer's directions.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.6 FIELD QUALITY CONTROL:

- A. Upon completion of installation of electrical grounding systems, test ground resistance with ground resistance tester. Where tests show resistance to ground over 10 ohms, take appropriate action to reduce resistance to 10 ohms, or less, by driving supplemental 10' x 3/4" copper ground rods; then retest to demonstrate compliance.

END OF SECTION

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

SECTION 26 0533 – METALLIC CONDUITS/RACEWAYS AND FITTINGS

PART 1 GENERAL

1.1 SCOPE:

- A. This section includes the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounded raceway systems.
- B. Types of raceways in this section include the following:
 - 1. Galvanized rigid metal conduit (GRC)
 - 2. Intermediate metal conduit (IMC)
 - 3. Electrical metallic tubing (EMT)
 - 4. Flexible metal conduit
 - 5. Liquidtight flexible metal conduit
- C. The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. Division 1
 - 2. All other Division 26000 sectionsf

1.3 QUALITY ASSURANCE:

- A. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.
- B. UL Compliance and Labeling: Comply with provisions of UL safety standards pertaining to raceways systems; and, provide products and components which have been UL listed and labeled.
- C. NEC Compliance: Comply with requirements as applicable to construction and installation of raceway systems.

PART 2 - PRODUCTS

2.1 RIGID STEEL CONDUIT:

- A. Metal rigid steel conduit shall conform to ANSI C80.1 and Underwriter's Laboratories UL-6 specification, ANSI C80.1.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- B. Conduit shall be hot-dipped galvanized to provide a corrosion resistant coating.
- C. Fittings: Fittings shall be ANSI/NEMA FB 1 threaded type, hot dipped or electronic plated. Threaded conduit to be secured to boxes, cabinets, etc., by means of galvanized threaded bushings on the inside and bond-type locknuts on the inside and outside of such boxes and cabinets. Fittings shall be watertight and the same material as conduit installed with factory manufactured elbows.

2.2 RIGID INTERMEDIATE STEEL CONDUIT (IMC):

- A. Intermediate Metallic Conduit shall conform to ANSI C80.1 and proposed Underwriter's Laboratories UL 1242 specification.
- B. Conduit shall be hot-dipped galvanized to provide a corrosion resistant coating. Intermediate Metallic Conduit (IMC) shall have galvanized/metallized thread protection, and pipe interior shall be protected by corrosion inhibiting coating.
- C. Fittings: Shall be similar to GRC.
- D. Maximum allowable size shall be (4) inches.

2.3 ELECTRICAL METALLIC TUBING (EMT):

- A. Electrical metallic tubing shall conform to ANSI C80.3 and Underwriter's Laboratories UL 797.
- B. EMT shall be hot-dipped galvanized steel with internal coating of silicone epoxy lubricant to assist in wire pulling.
- C. Fittings: Shall be compression type, steel or malleable iron. Set screw or indentation type of fittings are not acceptable.

2.4 FLEXIBLE METAL CONDUIT:

- A. Flexible metal conduit shall conform to UL 1.
- B. Flexible conduit to be of hot-dipped galvanized interlocked spirally wound steel strip.
- C. Fittings shall be multiple point type, threading into the internal wall of the conduit convolutions, and shall have insulated throat. Connectors to be galvanized and be suitable for connection to associated boxes and conduits.

2.5 LIQUID TIGHT FLEXIBLE METAL CONDUIT:

- A. Liquid-tight flexible metal conduit shall conform to UL 360.
- B. Liquid-tight flexible metal conduit shall consist of flexible galvanized steel tubing over which is extruded a liquid-tight jacket of polyvinyl chloride (PVC). Conduit shall be provided with a continuous copper bonding conductor wound spirally between the convolutions.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- C. Fittings used shall be reusable type of malleable iron/steel construction, electro zinc plated inside and outside, furnished with nylon insulated throat and taper threaded hub. Connectors to be galvanized and be suitable for connection to associated boxes and conduits.

2.6 EXPANSION AND DEFLECTION COUPLINGS:

- A. UL 467 and UL 514 shall apply.
- B. Shall accommodate, 1.9 cm (0.75 inch) deflection, expansion, or contraction in any direction, and shall allow 30 degree angular deflections.
- C. Shall include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC code tables for ground conductors.
- D. Shall be watertight, seismically qualified, corrosion-resistant, threaded for and compatible with rigid or intermediate metal conduit.
- E. Jacket shall be flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber material with stainless steel jacket clamps.

2.7 CONDUIT SUPPORTS:

- A. All parts and hardware shall be zinc-coated or have equivalent corrosion protection.
- B. Pipe straps: Fed. Spec. FF-S-760, type 1, style A or B.
- C. Individual conduit hangers: Shall be designed for the purpose, and have pre-assembled closure bolt and nut, and provisions for receiving hanger rod.
- D. Multiple conduit (trapeze) hangers shall be not less than 1-1/2 x 1-1/2 inch, 12 gage steel, cold formed, lipped channels. Hanger rods shall be not less than 3/8 inch diameter steel.
- E. Solid masonry and concrete anchors: Fed. Spec. FF-S-325 shall apply. Anchors shall be GROUP III self-drilling expansion shields, or machine bolt expansion anchors GROUP II type 2 or 4, or GROUP VII.

PART 3 - EXECUTION

3.1 CONDUIT INSTALLATION SCHEDULE:

- A. Interior power distribution feeders: EMT
- B. Motor feeders: Same requirements as power distribution feeders.
- C. Branch circuits from panelboards (not described above):
 - 1. Exposed to weather - GRC or IMC
 - 2. Concealed dry interior location - EMT.
- D. Fire alarm system conduits: Same requirements as branch circuits.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.2 CONDUIT INSTALLATION - GENERAL:

- A. Installation shall be in accordance with UL, NEC, as shown on the drawings, and as hereinafter specified.
- B. Contractor shall lay out and install conduit runs to avoid proximity to hot pipes. In no case will a conduit be run within three inches of such pipes, except where crossings are unavoidable and then conduit shall be kept at least one inch from the covering on pipe crossed.
- C. Conduits shall be supported as required to comply with applicable paragraphs of the NEC.
- D. Conduit installation shall be as follows:
 - 1. Installed as complete runs before pulling in cables or wires.
 - 2. Flattened, dented, crushed or deformed conduit is not permitted and shall be removed and replaced at no cost to the Owner.
 - 3. Installed so they will not obstruct head room, walkways, doorways or work by other trades.
 - 4. Cut square with a hacksaw, reamed, burrs removed, and drawn up tight.
 - 5. Mechanically and electrically continuous.
 - 6. Supported within one foot of all changes of direction, and within one foot of each enclosure to which connected.
 - 7. Ends of empty conduit to be closed with plugs or caps at rough-in stage to prevent entry of debris until wires are pulled in.
 - 8. Conduits shall be secured to cabinets, junction boxes, pull boxes, and outlet boxes by bonding type locknuts.
 - 9. See architectural detail for conduit penetrations of roof membrane.
- E. Conduit Bends:
 - 1. Shall be made with standard conduit bending machines.
 - 2. Conduit hickey may be used for slight offsets, and for straightening stubbed out conduits.
 - 3. Conduits shall not be bent with a pipe tee or vice.
- F. Conduit shall be securely fastened in place at intervals as specified by the code using suitable straps, hangers and other supporting assemblies. All strap hangers and supporting assemblies:
 - 1. Shall be of rugged construction capable of supporting weight with a reasonable factor of safety.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2. Shall be adequately protected against corrosion.
- G. In wet locations or in locations where corrosive conditions are present, vertical and horizontal runs of conduit shall be firmly supported so that there is at least 1/4" air space between the conduit and the wall or supporting surface. Spacers and supporting straps shall be of malleable iron construction, hot dipped galvanized.
- H. EMT shall be securely fastened in place at intervals as specified by the code using straps, hangers and other supporting assemblies.
1. Spacers and supporting straps shall be of rugged malleable iron or steel construction hot dipped galvanized.
- I. Flexible conduit when installed shall have sufficient slack to avoid sharp flexing and straining due to vibration and thermal expansion/construction. Conduit shall be installed in such a manner that liquids will tend to run off the surface instead of draining towards the fittings.
- J. Concealed work installation:
1. In concrete:
 - a. Conduit shall be run in direct lines.
 - b. Conduit shall not be installed through concrete beams, except where shown on the structural drawings or as approved by the Engineer prior to construction, and after submittal of drawing showing locations size, and position of each penetration.
 - c. Conduit shall not be installed in concrete which is less than three inches thick.
 - d. Conduit outside diameter larger than 1/3 of the concrete thickness is not permitted.
 - e. Spacing between conduits in slab shall be approximately six conduit diameters apart except one conduit diameter at conduit crossings.
 - f. Conduits shall be installed approximately at the center of the slab.
 - g. Couplings and connections shall be water tight. Thread compounds shall be UL approved conductive type to ensure low resistance ground continuity through the conduits.
 2. Conduit shall be run parallel or perpendicular to the building lines.
 3. Branch circuit conduits, and conduits feeding ceiling lighting shall not be supported by the suspended ceiling, lighting fixtures, or air conditioning ducts.
 4. Recessed lighting fixtures shall be connected to conduit with not over six feet of flexible metal conduit.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

K. Exposed work installation:

1. Conduit shall be run parallel or perpendicular to the building lines.
2. Horizontal runs shall be installed close to the ceiling or beams and secured with approved conduit straps.
3. Horizontal or vertical runs shall be supported at not over eight foot intervals.

L. Surface metal raceways:

1. Surface metal raceways shall be used only where shown on the drawings.

3.3 UNDERGROUND INSTALLATION: N/A

3.4 MOTORS AND VIBRATING EQUIPMENT:

- A. Flexible metal conduit shall be used for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission. Flexible metal conduit shall be liquid-tight when installed in exterior locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, and locations subject to seepage or dripping of oil, grease or water. Flexible metal conduit shall be installed with green ground wire.

3.5 EXPANSION JOINTS:

- A. Conduits 3 inches and larger, rigidly secured to building construction on opposite sides of a building expansion joint, shall be provided with expansion and deflection couplings. The couplings shall be installed in accordance with the manufacturer's recommendations.
- B. Conduits smaller than 3 inches shall be provided with junction boxes on both sides of the expansion joint, and connected by 15 inches of slack flexible conduit. Flexible conduit shall have a copper green ground bonding jumper installed. In lieu of this flexible conduit, expansion and deflection couplings as specified above may be installed.
- C. Expansion and deflection couplings shall also be installed where shown on the drawings.

3.6 CONDUIT SUPPORTS, INSTALLATION:

- A. Safe working load shall not exceed 1/4 of proof test load of fastening devices.
- B. Pipe straps or individual conduit hangers shall be used for supporting individual conduits.
- C. Multiple conduit runs shall be supported by trapeze hangers. Trapeze hangers shall be designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 200 pounds. Each conduit shall be attached by U-bolt or other approved fastener.
- D. Conduit shall be supported independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, etc.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- E. Solid Masonry and Concrete: Fasteners shall be as follows:
 - 1. New construction: Generally, steel or malleable iron concrete inserts in concrete prior to pouring.
 - 2. Existing construction:
 - a. Steel expansion anchors not less than 1/4-inch bolt size and not less than 1-1/8 inch embedment.
 - b. Power set fasteners shall be approved, and not less than 1/4-inch diameter with depth of penetration not less than three inches.
 - c. Anchors or fasteners attached to concrete ceilings shall be vibration and shock resistant.
- F. Hollow masonry. Toggle bolts are permitted. Bolts supported only by plaster are not acceptable.
- G. Metal structures. Fasteners shall be machine screw or devices specifically designed and approved for the application.
- H. Attachments by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking is not permitted.
- I. Chain, wire, or perforated strap shall not be used to support or fasten conduit.
- J. Vertical supports. Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown on the drawings. Supports for cable and wire shall have fittings which include internal wedges and retaining collars.

3.7 FIRE ALARM SYSTEM CONDUIT:

- A. All wiring shall be installed in conduit.
- B. Size all conduit as required per NEC and manufacturers' recommendations for number of wires or cables but minimum size shall be 3/4".
- C. Install junction boxes and pull boxes as required for each system.
- D. Conduit bends shall be long radius.

3.8 PULL WIRES:

- A. Install a nylon pull string in fire alarm system conduits.

3.9 PAINTING: N/A

END OF SECTION 26 0533

SECTION 25 0535 - ELECTRICAL BOXES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section includes the furnishing, installation and connection of all outlet boxes, junction boxes, and floor boxes as shown on the drawings or as required to house the intended wiring, devices or equipment.
- B. Types of electrical boxes and fittings specified in this section include the following:
 - 1. Outlet boxes
 - 2. Junction boxes
 - 3. Pull boxes

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS:

- A. Outlet and Device Boxes (dry interior locations): Provide galvanized coated sheet-steel outlet wiring boxes, of shapes, cubic inch capacities, and sizes, including box depths as required by particular application, suitable for installation at respective locations. Construct outlet boxes with mounting holes, and with conduit size knockout openings in bottom and sides. Provide boxes with threaded screw holes, with corrosion-resistant cover and grounding screws for fastening surface and device type box covers, and for equipment type grounding.
- B. Outlet and Device Box Accessories: Provide outlet box accessories as required for each installation, including box supports, mounting ears and brackets, wallboard hangers, box extension rings, fixture studs and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used to fulfill installation requirements for individual wiring situations.
- C. Outlet and Device Boxes (damp and wet locations): Provide corrosion resistant cast metal raintight outlet and wiring device boxes of types, shapes and sizes required for each application, including depth of boxes, with threaded conduit holes for fastening electrical conduit, and cast metal face plates. Where weatherproof devices are indicated, provide spring hinged watertight caps suitable configured for each application, including face plate gaskets and corrosion resistant plugs and fasteners.
- D. Junction and Pull Boxes: Provide galvanized code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes, to suite each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- E. Bushings, Knockout Closures, and Locknuts: Provide corrosion resistant box knockout closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes, to suit respective installation requirements and applications.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS:

- A. General: Install electrical boxes and fittings as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation," and in accordance with recognized industry practices to fulfill project requirements.
- B. Coordinate installation of electrical boxes and fittings with wire/cable, wiring devices, and raceway installation work.
- C. Provide weathertight outlets for interior and exterior locations exposed to weather or moisture.
- D. Provide knockout closures to cap unused knockout holes where blanks have been removed.
- E. Avoid installing boxes back-to-back in walls.
- F. Position recessed outlet boxes accurately to allow for surface finish thickness.
- G. Set floor boxes level and flush with finish flooring material. Provide trim flange to match finish floor material.
- H. Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry.

3.2 GROUNDING:

- A. Upon completion of installation work, properly ground electrical boxes and demonstrate compliance with requirements.

END OF SECTION

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

SECTION 26 0548 – SEISMIC SUPPORT OF ELECTRICAL EQUIPMENT

PART 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of seismic support of electrical equipment systems and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1
2. All other Division 26 sections
3. All Division 27 and 28 sections

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All seismic equipment and design shall comply with all local codes and ordinances and meet or exceed the standards and procedures (latest editions) of the following:

- a. IBC 2012

B. Seismic control equipment shall be sized and provided by manufacturer. Seismic bracing shall be a factory manufactured item listed in the manufacturers catalog for the intended use.

C. Manufacturer:

1. The seismic control supports manufacturers shall be as manufactured by one of the following or approved equal:

- a. Mason Industries
- b. Amber Booth
- c. Peabody

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

1.4 SUBMITTALS:

- A. The manufacturer shall submit drawings including floor plans, sections and elevations showing piping, duct, and equipment. Drawings shall indicate location and type of all components provided.
- B. A schedule shall show capacity and load of each component at each location.
- C. Design shall be based upon actual installation and not contract drawing schematics.
- D. Submittals shall include:
 - 1. Sketches showing seismic loading, location of bracing and types and sizes of bracing assemblies.
 - 2. Submit seismic protection ratings in three principle axes certified by an independent laboratory.
 - 3. Submit calculations for shear, pull-up, primary overturning, and secondary overturning.
 - 4. Submit drawings indicating auxiliary supports and method of attachment.
 - 5. Calculations shall be submitted and signed by a licensed professional engineer.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. All equipment and applicable conduit shall be mounted on or suspended from approved foundations and supports as specified herein and as shown on the drawings.
- B. Steel components shall be phosphated and painted. All nuts, bolts, and washers shall be zinc-electroplated.

2.2 BRACING HANGERS:

- A. Seismic bracing shall be a factory manufactured item listed in the manufacturers catalog for the intended use.
- B. Equipment sway bracing shall be provided for all items supported by off-the-floor structures or structures suspended from floors or roof above.
 - 1. Braces shall consist of angles, rods, bars, or pipes run at 45% angles from the equipment frame to the building structure secured at both ends with bolts 1/2" or larger.
 - 2. Bracing shall be provided in two planes of direction, 90 degrees apart, for each item of equipment.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.3 ANCHOR BOLTS AND NUTS FOR PAD MOUNTED EQUIPMENT:

- A. Pad mounted equipment shall be anchored with a minimum of four (4) bolts. Each bolt shall be a 6" in length or at least 10 times longer than the nominal diameter of the bolt with a 90 degree hook on the non-threaded end.
- B. Nuts shall be heavy duty hexagon nuts.
- C. Minimum bolt sizes are as follows:
 - 1. Equipment up to 500 pounds, 3/8" diameter.
 - 2. Equipment from 500 to 1000 pounds, 1/2" diameter.
 - 3. Equipment from 1000 to 5000 pounds, 5/8" diameter.
 - 4. Equipment from 5000 to 10000 pounds, 3/4" diameter.

2.4 ELECTRICAL EQUIPMENT:

- A. Systems include but are not limited to the following:
 - 1. Electrical switchgear
 - 2. Electrical conduit 2-1/2" inside trade diameter or greater
 - 3. Panelboards
 - 4. Dry Type Transformers
 - 5. Emergency Lighting Systems
 - 6. Lighting fixtures:
 - a. Lighting fixtures installed in suspended ceiling systems shall conform to the guidelines of Cisca.
 - b. Recessed lighting fixtures shall be independently supported from the structure. The suspended ceiling system shall not be used to support the fixtures.
 - c. Surface mounted fixtures shall be attached to the ceiling system with positive clamping devices that completely surround the ceiling members. Safety devices shall be attached between the clamping device and the adjacent ceiling hanger or to the structure above.
 - d. Pendant hung lighting fixtures shall be supported directly from the structure above using No. 9 gauge wire without using the ceiling suspension system for direct support.
 - 7. Fire Alarm Systems
- B. Electrical conduit of any size suspended by individual hangers of less than 12 inches from top of conduit to the supporting structure do not have to be seismically braced.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

C. Slab or floor mounted equipment not subject to movement or vibration.

1. Equipment shall be direct anchored.

D. Roof Mounted Equipment:

1. Equipment shall be direct anchored.

2. Curbs and equipment supports shall be attached to roof structure.

2.5 SEISMIC ACCESSORIES:

A. Provide all necessary brackets, bolts, fasteners, predrilled bases, oversized bases, accessory components and materials to install systems in accordance with manufacturer's requirements.

PART 3 - EXECUTION

3.1 GENERAL:

A. If the equipment to be mounted is not furnished with integral structural frames and external mounting lugs (both of suitable strength and rigidity), approved structural subbase shall be installed in the field which shall support the equipment to be hung and to which shall be attached the hangers.

3.2 SUPERVISION:

A. The manufacturer, or his qualified representative, shall be responsible for providing such supervision as may be necessary to assure correct installation and adjustment of the isolators. Upon completion of the installation and after the system is put into operation, the manufacturer, or his representative, shall make a final inspection and submit his report to the Architects and Engineers in writing certifying the correctness of installation and compliance with approved submittal data.

END OF SECTION

SECTION 26 2200 – DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section includes the furnishing, installation, and connection of dry type transformers to form complete, coordinated, grounded distribution systems.
- B. The term transformer, as used in this specification, shall mean any or all of the transformer types specified.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. Division 1
- B. See section on Substitutions.

1.3 QUALITY ASSURANCE:

- A. NEC Compliance: Comply with NEC as applicable to installation and construction of dry type transformers.
- B. UL Compliance: Provide transformers and components which are listed and labeled. Comply with provisions of UL 506 and UL 1561.
- C. ANSI/NEMA: Comply with all applicable ANSI/NEMA standards (ANSI C89.2, NEMA ST-20), unless more stringent requirements are required by the specifications or drawings.

1.4 SUBMITTALS:

- A. Submit catalog cuts and descriptive literature for approval in accordance with Section 26 0500, ELECTRICAL GENERAL REQUIREMENTS.
- B. The specific item proposed and its area of application shall be marked on the catalog cuts.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Equipment delivery shall be scheduled just prior to installation to minimize on site storage time and possible damage from adverse conditions. Deliver, store and handle transformers in accordance with manufacturers written instructions and the following:
 - 1. Transformers shall be stored in dry interior locations completely protected from weather, adverse conditions and construction activity. Equipment

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

shall be considered in storage until such time switchboard is energized and any time power is removed for 4 hours or more.

2. Remove loose packing, flammable materials and shipping braces from inside transformers and install temporary electric heating, size as indicated in manufacturers written instructions.

PART 2 - PRODUCTS

2.1 GENERAL TRANSFORMER SPECIFICATIONS:

- A. Transformer coils shall be of the continuous wound construction and shall be impregnated with nonhygroscopic, thermosetting varnish.
- B. All cores to be constructed of high grade, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point. The core laminations shall be tightly clamped and compressed. The completed core and coil shall then be bolted to the base of the enclosure but isolated therefrom by means of rubber, vibration-absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure. On transformers 500 KVA and smaller, the vibration isolating system shall be designed to provide a permanent fastening of the core and coil to the enclosure. Sound isolating systems requiring the complete removal of all fastening devices will not be acceptable.
- C. The entire transformer enclosure shall be degreased, cleaned, phosphatized, primed and finished with a grey, baked enamel.
- D. Basic Impulse Level (BIL): Shall be 10kv minimum.
- E. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA, IEEE, and ANSI standards.
- F. Sound levels shall be guaranteed by the manufacturer not to exceed the following:
 1. Up to 9 KVA: 40 dB
 2. 10 to 50 KVA: 45 dB
 3. 51 to 150 KVA: 50 dB
 4. 151 to 300 KVA: 55 dB
 5. 301 to 500 KVA: 60 dB
 6. 501 to 700 KVA: 62 dB
 7. 701 to 1000 KVA: 64 dB

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.2 DRY TYPE TRANSFORMERS (15 KVA AND LARGER):

- A. Transformers 15 KVA and larger shall have a minimum of 6-2 1/2% full capacity primary taps, 2 above and 4 below normal voltage.
- B. Transformers 15 KVA and larger shall have 220 degrees C insulation with 150°C rise based on 40°C ambient.
- C. Transformers 15 KVA and larger shall be in a heavy gauge, sheet steel, ventilated enclosure. The ventilating openings shall be designed to prevent accidental access to live parts in accordance with UL, NEMA, and National Electrical Code standards for ventilated enclosures.
- D. Mounting: Provide transformers of the floor mounting type.

2.3 SPECIFIED MANUFACTURING

- A. Transformers shall be manufactured by one (1) of the following, or approved equal:
 - 1. General Electric
 - 2. Square D
 - 3. Cutler Hammer

PART 3 - EXECUTION

3.1 TRANSFORMER MOUNTING (FLOOR):

- A. All transformers shall be installed on six (6) inch raised concrete pads. Include 1/4" reinforcement basis in a grid pattern eight (8) inches on center in the raised pad.
- B. Bolt transformer to the raised pad.

3.2 TRANSFORMER MOUNTING (WALL):

- A. Where wall mounted or suspended transformers are indicated on plans, coordinate requirements and installation of wall-mounting and structure-hanging supports with building structure and transformer provided.

END OF SECTION

SECTION 26 2416 - PANELBOARDS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section includes the furnishing and installation, at locations shown on the drawings, of approved panelboards of a type indicated and specified herein.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. Division 1
 - 2. All other Division 26000 sections

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: UL Listed and labeled as defined in the NEC, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NEMA PB 1.
- E. Comply with NEC.
- F. Panelboards shall comply with UL 67.
- G. Cabinet and boxes shall comply with UL 50.

1.4 SUBMITTALS:

- A. Submit catalog cuts and descriptive literature for approval in accordance with Section 260500, ELECTRICAL GENERAL REQUIREMENTS.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

C. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Service Conditions: NEMA PB 1.

1.6 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.7 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Keys: Two spares for each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 LABELING:

- A. All panels shall be UL labeled.
- B. All panels used as a service entrance, shall be labeled as such.
- C. A nameplate shall be provided listing panel type and ratings.

2.2 GENERAL PANELBOARD CONSTRUCTION:

- A. General: Except as otherwise indicated, provide panelboards, enclosures and ancillary components, of types, sizes, and ratings indicated, which comply with manufacturer's standard materials, design and construction in accordance with published product information; equip with proper number of unit panelboard devices as required for complete installation. Where types, sizes, or ratings are not indicated, comply with NEC, UL, and established industry standards for those applications indicated.
- B. Distribution, Lighting, and Appliance Panelboards: Provide dead-front safety constructed factory assembled circuit breaker type panelboards in sizes and ratings as indicated. Construct with rectangular shaped copper or tin plated

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

aluminum bus bars which are securely mounted and braced, and with lugs bolted to main bus bars.

1. Provide anti-turn solderless pressure type lug connectors approved for copper conductors, and construct unit for connecting feeders at top of panel.
 2. Equip with full-sized neutral bus bar with suitable lugs for circuits requiring neutral connection. Provide suitable lugs on neutral bus for each outgoing feeder required.
 3. Provide main and branch circuit breakers. Breakers shall be molded case bolt-in type, heavy-duty, quick-make, quick-break, with toggle handles that indicate when tripped. Where multipole breakers are indicated, provide with common trip so that overload on one pole will trip all poles simultaneously.
 4. Provide bare uninsulated grounding bars suitable for bolting to enclosures.
- C. Panelboard Enclosures: Provide galvanized sheet steel cabinet type enclosures, in sizes and NEMA types as indicated, code-gage, minimum 16-gage thickness. Construct with multiple knockouts and wiring gutters. Provide door-in-door fronts, with flush locks and keys, all panelboard enclosures keyed alike. Door hinges shall be piano hinges. Equip with interior circuit-directory frame, and card with clear plastic covering. Provide baked gray enamel finish over a rust inhibitor coating. Provide enclosures which are fabricated by same manufacturer as panelboards, which mate properly with panelboards to be enclosed.
- D. Panelboard Accessories: Provide panelboard accessories and devices including, but not necessarily limited to circuit breakers as recommended by panelboard manufacturer for ratings and applications indicated.
- E. Panelboards shall be shown in the following schedule, or approved equal, and shall be completely factory assembled. Do not purchase panelboards or cabinets until shop drawings have been approved.
1. Branch Circuit Panelboards (120/208 or 120/240 V Operation). Minimum cabinet width shall be 20".

Square D	NQ
General Electric	AQ
Siemens	P1
 2. Branch Circuit Panelboards (277/480 V Operation). Minimum cabinet width shall be 20".

Square D	NF
General Electric	AD
Siemens	P2/P3

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3. Distribution Panelboards (600 Amp bus & Larger).

Square D
General Electric
Siemens

I-Line
Spectra Series
P4/P5

- F. Where a specific interrupting rating is shown on the drawings, panelboards and associated circuit breakers shall be rated for that value as a minimum. **Series ratings of equipment is not acceptable.**

PART 3 - EXECUTION

3.1 INSTALLATION OF PANELBOARDS:

- A. General: Install panelboards and enclosures as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC standards and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.
- B. Coordinate installation of panelboards and enclosures with cable and raceway installation work.
- C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds. 486A.
- D. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secure.
- E. Provide properly wired electrical connections within enclosures.
- F. Fill out panelboard's circuit directory card upon completion of installation work. Type text, handwriting is not acceptable. Directory shall reflect actual installation configuration and shall incorporate final room numbers. Room numbers shown on architectural plans shall not be used for the directory.
- G. Installation shall comply with the NEC.
- H. Anchor to walls per manufacturer's recommendation.
- I. Lace all feeder cables with tie wraps in panel housing. All wiring shall be run square inside housing.
- J. Vacuum panel housing to remove all dust and dirt from housing prior to final inspection.
- K. Cover panel housing prior to room painting. Clean all paint from panel.
- L. Attach identification labels to panel with rivets or sheet metal screws.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.2 GROUNDING:

- A. Provide equipment grounding connections for panelboards as indicated. Tighten connections to comply with tightening torques specified in UL Stds. 486A to assure permanent and effective grounds.

3.3 FIELD QUALITY CONTROL:

- A. Prior to energization of circuitry, check all accessible connections to manufacturer's tightening torque specifications.
- B. Prior to energization of panelboards, check with ground resistance tester phase-to-phase and phase-to-ground insulation resistance levels to ensure requirements are fulfilled.
- C. Prior to energization, check panelboards for electrical continuity of circuits, and for short circuits.
- D. Subsequent to wire and cable hook-ups, energize panelboards and demonstrate functioning in accordance with requirements. Where necessary, correct malfunctioning units and then retest to demonstrate compliance.

END OF SECTION

SECTION 26 2726 - WIRING DEVICES

PART 1 – GENERAL

1.1 SCOPE:

- A. This section includes the furnishing, installation, and connection of wiring devices as shown on the plans.
- B. Types of electrical wiring devices in this section include the following:
 - 1. Receptacles
 - 2. Switches
 - 3. Faceplates

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. Division 1
 - 2. All other Division 26 sections
- B. See section on Substitutions.

1.3 QUALITY ASSURANCE:

- A. NEC Compliance: Comply with NEC as applicable to installation and wiring of electrical wiring devices.

1.4 SUBMITTALS:

- A. Submit catalog cuts and descriptive literature for approval in accordance with Section 16020, ELECTRICAL COORDINATION.
- B. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
- C. The specific item proposed and its area of application shall be marked on the catalog cuts.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

PART 2 – PRODUCTS

2.1 FABRICATED WIRING DEVICES:

- A. General: Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and which comply with NEMA Stds. Pub. No. WD 1. Unless noted otherwise device color shall be ivory.
- B. Wiring Devices: All NEMA 5-20R receptacles shall be hospital grade, ivory color except that all wiring devices connected to emergency power shall be red (disregard color indicator in model numbers for emergency wiring devices).
- C. Wiring devices shall be as listed in the following table, or approved equal.

<u>Description</u>	<u>Cooper WD</u>	<u>Hubbell</u>	<u>Leviton</u>	<u>P & S</u>
Single Pole Toggle Switch	2221V	HBL1221-I	1221-2I	PS20AC1-I
Three Way Toggle Switch	2223V	HBL1223-I	1223-2I	PS20AC3-I
20A 125V 2P 3W Grounded Duplex Ground Fault Interrupter (NEMA 5-20R)	GF20V	GF-5262-I	6899-I	2091-I

2.2 WEATHERPROOF RECEPTACLES:

- A. Weatherproof receptacles shall be duplex GFI receptacles as specified herein, mounted in cast metal outlet box fitted with a gasketed metal cover with spring door.

2.3 DEVICE PLATES:

- A. All outlet boxes shall have a coverplate. All interior device plates shall be 302 stainless steel.
- B. All coverplates for devices in flush boxes shall be oversized (mid-size). All coverplates for devices in surface boxes shall be standard size.
- C. Faceplates: Provide faceplates for single and combination wiring devices, of types, sizes, and with ganging cutouts as indicated. Select plates which mate and match wiring devices to which attached. Metal screws shall be used for securing plates to devices; screw heads colored to match finish of plates.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES:

- A. Install wiring devices as indicated; in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.
- B. Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices with other work.
- C. Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt, and debris.
- D. The devices shall be installed in such a manor as to allow the faceplates to be installed without distortion of the faceplate or gaps between the faceplate and wall.

3.2 PROTECTION OF FACEPLATES AND RECEPTACLES:

- A. At time of Substantial Completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

3.3 GROUNDING:

- A. Provide equipment grounding connections for wiring devices, unless otherwise indicated. Tighten connections to comply with tightening torques specified in UL Std. 486A to assure permanent and effective grounds.

3.4 TESTING:

- A. Prior to energizing circuitry, test wiring for electrical continuity, and for short circuits. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements.

END OF SECTION

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

SECTION 26 2816 – SAFETY/DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

- A. This section includes the furnishing, installation, connection, and wiring of safety switches.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:
 - 1. Division 1
 - 2. All other Division 26000 sections
- B. See section on Substitutions.

1.3 QUALITY ASSURANCE:

- A. Safety/Disconnect switches shall conform to Underwriter's Laboratories UL 98, "Enclosed and Dead-Front Switches."

1.4 SUBMITTALS:

- A. Submit catalog cuts and descriptive literature for approval in accordance with Section 260500, ELECTRICAL GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

2.1 GENERAL SAFETY/DISCONNECT SWITCH FEATURES:

- A. Furnish and install safety/disconnect switches as indicated on the plans and specifications.
- B. Switches shall be NEMA type HD (Heavy Duty) and UL listed.
- C. All switches shall have switch blades which are fully visible in the "OFF" position when the switch door is open. All current carrying parts shall be plated to resist corrosion and promote cool operation. Switches shall have removable arc suppressors where necessary to permit easy access to line side lugs. Lugs shall be front removable and UL listed for 60 degrees C and 75 degrees C, aluminum or copper wires.
- D. Switches shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started. The operating handle shall be an integral part of the box, not the cover. Provisions for padlocking the switch in the "OFF" position with at least three locks shall be provided. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door when the handle is in the "ON" position, and to prevent closing of the switch

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

mechanism with the door open. The handle position shall indicate whether the switch is "ON" or "OFF".

- E. Switches shall be horsepower rated for AC and/or DC as indicated by the plans. All fusible switches rated 100 thru 600 amperes at 240 volts and 30 thru 600 amperes at 600 volts shall have a UL approved method of field conversion from standard Class H fuse spacing to Class J fuse spacing. The switch also must accept Class R fuses and have provisions for field installation of a UL listed rejection feature to reject all fuses except Class R. The UL listed short circuit rating of the switches shall be 200,000 rms symmetrical amperes when Class R or Class J fuses are used with the appropriate rejection scheme. The UL listed short circuit rating of the switch, when equipped with Class H fuses, shall be 10,000 rms symmetrical amperes. 800 and 1200 ampere switches shall have provisions for Class L fuses and shall have a UL listed short circuit rating of 200,000 rms symmetrical amperes.
- F. Disconnect switches shall be equipped with ground lug.

2.2 NEMA 1 AND 3R HEAVY DUTY SAFETY/DISCONNECT SWITCHES:

- A. Switches shall be furnished in NEMA 1 general purpose enclosures unless exposed to weather which shall be NEMA 3R. Covers on NEMA 1 enclosures shall be attached with pin type hinges. NEMA 3R covers shall be securable in the open position. NEMA 3R enclosures for switches thru 200 amperes shall have provisions for interchangeable bolt-on hubs. Hubs shall be as indicated on the plans. NEMA 3R enclosures shall be manufactured from galvanized steel. Enclosures shall have a gray baked enamel finish, electrodeposited on cleaned, phosphatized steel.
- B. Switches shall comply with paragraph 2.01 of this section.

2.3 NEMA 4X HEAVY DUTY SAFETY/DISCONNECT SWITCHES:

- A. Provide NEMA 4X disconnect switches where indicated on the drawings.

2.4 SPECIFIED MANUFACTURERS:

- A. Specified manufacturers shall be as follows, or approved equal:
 - 1. General Electric
 - 2. Square D
 - 3. Siemens

PART 3 - EXECUTION

3.1 INSTALLATION LOCATION:

- A. As a general rule, install switches on the equipment it serves, if shown that way on the drawings.
- B. Do not install switch on equipment removable panel.
- C. All switches shall be accessible.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.2 GROUNDING:

- A. Connect ground wires to ground lug.
- B. See section - GROUNDING.

3.3 CONDUIT BUSHINGS:

- A. Use plastic bushings where conduit enters switch.

END OF SECTION 26 2816

SECTION 26 5100 – LIGHTING

PART 1 - GENERAL

1.1 SCOPE:

- A. This section included the furnishing, installation, and connection of light fixtures, conduit, lamps, fittings, and boxes to form complete, coordinated, grounded interior lighting systems.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included.

1.3 QUALITY ASSURANCE:

- A. NEC Compliance: Comply with NEC as applicable to installation and construction of lighting fixtures.
- B. UL Compliance: Provide lighting fixtures which have been UL listed and labeled.
- C. CBM Labels: Provide fluorescent lamp ballasts which comply with certified Ballast Manufacturers Association standards and carry the CBM label.

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES - GENERAL:

- A. Shall conform to the drawings and fixture schedule.

2.2 FLUORESCENT LIGHTING FIXTURES:

- A. Fluorescent lighting fixtures shall conform to UL 1570.
- B. Ballasts for fluorescent fixtures:
 - 1. Programmed start electronic ballast with 1.0 ballast factor and < 10% THD & PF = 0.98.
 - 2. U.L. 935 listed.
 - 3. All lamps shall be connected in parallel.
- C. Lamps:
 - 1. Types shall be as indicated by the lighting fixture schedule.
 - 2. Color:
 - a. T-8 Lamps shall be G.E. SPX 41 or equal by Sylvania or Phillips.
 - b. Compact fluorescent lamps shall be 4100K.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.3 HIGH INTENSITY DISCHARGE (HID) LIGHTING FIXTURES:

- A. HID lighting fixtures shall conform to UL 1029 and UL 1572.

2.4 INCANDESCENT LIGHTING FIXTURES:

- A. Conform to UL 1571 for general incandescent lighting fixtures. Lighting fixtures for damp and wet locations shall conform to UL 57.
- B. Lamps: Refer to lighting fixture schedule on drawings.
- C. Fixture Types: Refer to lighting fixture schedule on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Installation shall be in accordance with the NEC, and as shown on the drawings. Align, mount, and level the lighting fixtures uniformly.
- B. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the drawings.
- C. Support fixtures securely from building structure. Grid ceiling framing members shall not be used to support fixtures. Use earthquake clips on all fixtures.

3.2 CLEAN-UP AND RE-LAMPING:

- A. Before final acceptance of the electrical work in all or any part of the building, the Contractor shall clean the bottoms, the trim, the reflecting surfaces, lenses, baffles, reflector cones and lamps of all lighting fixtures.
- B. Mask the trim and bottoms of all lighting fixtures if necessary to protect the fixture during construction.
- C. Review and ensure that all lamps installed are exactly as specified for each fixture type.
- D. Replace all burned out or inoperative lamps and inoperative ballasts in all fixtures so that all lighting fixtures will be in first class operating condition upon acceptance.

END OF SECTION

SECTION 28 3111 - FIRE ALARM SYSTEM

PART 1 - GENERAL CONDITIONS

1.1 SCOPE:

- A. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations in connection with the fire alarm system renovation work shown on the drawings and as herein specified.
- B. The fire alarm system control panel is an existing Siemens/Cerberus MXL-3 system that shall remain in service. This system is comprised of a complete facility-wide automatic and manual fire alarm system and provides the following functions: manual and automatic signaling, visual alarm notification, off-premises central station reporting, input/output interfaces with elevator recall, remote annunciation, etc.
- C. The system shall including devices, equipment, and circuiting, and all labor required to provide a fully function, NFPA-72 compliant system.
- D. The building's fire alarm system shall signal all system alarm, trouble and supervisory conditions to the owner's designated remote monitoring station via an existing digital communicator. The existing digital communicator shall be fully tested prior to and after the elevator renovation work is performed for verification of all alarm and trouble functions associated with the elevator work.

1.2 RELATED WORK/SECTIONS:

- A. In addition to this section, the requirements of the conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.
- B. The work covered by this section of the specifications is to be coordinated with the related work as specified elsewhere under the project specifications.

1.3 QUALITY ASSURANCE:

- A. National Fire Protection Association (NFPA): Provide fire alarm and detection systems conforming to the requirements of the following publications (the editions enforced at the time of AHJ construction document review) including all amendments to these publications:
 - 1. NFPA 13 - Standard for the Installation of Sprinkler Systems.
 - 2. NFPA 70 - National Electrical Code.
 - 3. NFPA 72 - National Fire Alarm Code
 - 4. NFPA 101 - Life Safety Code

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- B. Underwriters Laboratories (UL): Construct all fire alarm and fire detection equipment in accordance with applicable standards pertaining to fire alarm facilities, equipment and installation.
- C. International Building Code: The entire installed system and all integrated system operations shall be within the guidelines of the current edition of the IBC International Building Code.
- D. NEMA Compliance: Comply with applicable portions of NEMA Std. Pub. SB 4 pertaining to installation of fire alarm systems.
- E. ANSI/ASME A17.1 - Safety Code for Elevators and Escalators

1.4 SUBMITTALS:

- A. Submit catalog cuts and descriptive literature for approval in accordance with Section 26 0501, ELECTRICAL COORDINATION.
- B. Shop Drawings: As a minimum, the fire alarm and fire detection shop drawing submittal shall include the following:
 - 1. Complete data sheets bearing the printed logo or trademark of the fire alarm control panel manufacturer for all equipment including but were not limited to the following:
 - a. Addressable control modules.
 - b. Each separate type of automatic smoke and fire detector to be connected to the system
 - c. Any other items of fire alarm equipment required by the drawings and/or specifications.
 - 2. Evidence of listing of all proposed equipment by Underwriter's Laboratories for application as fire alarm equipment.
 - 3. Provide complete narrative descriptions of the following system operations:
 - a. Elevator recall
 - 4. Provide specifications of all cable types labeled with their intended application. This cable shall have been tested and approved by the fire alarm control panel manufacturer for use with the manufacturer's equipment.

1.5 AS BUILT DRAWINGS: N/A

1.6 SYSTEM DESCRIPTION:

- A. General:

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

1. The existing fire alarm system is a fully networked, addressable, programmable intelligent system.
 2. All addressable devices are to have the capability of being disabled or enabled individually.
 3. Identification of Addressable Devices: Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact.
- B. The major existing system elements include but are not limited to the following items:
1. Control panel, power supplies, remote annunciator panels, addressable initiation devices, audible and visual notification appliances, batteries and chargers, fire detection, addressable input modules, addressable output modules, notification circuits, signaling circuits, and equipment enclosures.
 2. Intelligent addressable devices including but not limited to: manual pull stations, smoke detectors, heat detectors, duct smoke detectors, addressable input modules, and addressable output modules.
 3. Automatic and manual override audible evacuation signals and visual evacuation signals via:
 - a. Fire alarm horns with strobe lights.
 - b. Fire alarm horns.
 - c. Fire alarm strobe lights.
 4. Digital communicating, system driven remote annunciators where shown on the drawings.
 5. System software, database management utilities and firmware as required to provide a complete functioning interactive system.
- C. The system elements being provided in this project are as follows:
1. Addressable control modules (replacement units for elevator recall functions).
- D. Except for the fire alarm riser diagram, conduit is not shown on the plans although minimum conduit sizes specifications are noted on the drawings. It shall be the responsibility of the Electrical Contractor to coordinate with the fire alarm manufacturer to determine the conduit requirements (size and routing) required for proper system operation.
- E. System wiring is not shown on the drawings. Minimum wiring specifications are stated herein. However, it shall be the responsibility of the Contractor to coordinate with the fire alarm manufacturer to determine the actual wiring

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

requirements (size and type) required for proper system operation. All system wiring shall comply with the applicable parts of NEC Article 760, however.

1.7 EXISTING SYSTEM OPERATIONS (FOR INFORMATION ONLY):

- A. Activation of any system supervisory, trouble, status or alarm initiating device shall cause the following actions to occur.
 - 1. Log to the system history archives all activity pertaining to the alarm condition.
 - 2. Transmit the event to the owner's designated remote monitoring station.
- B. All trouble and supervisory events shall cause the audible trouble signal to sound at the main control panel and remote annunciator panel.
- C. Upon activation of any manual or automatic fire alarm initiating device, the following primary events shall occur:
 - 1. The main control panel, and remote annunciation panel(s) shall indicate the devices in alarm via LCD text messaging.
 - 2. The system shall automatically activate the audible and visual notification functions until the system is reset or manually overridden.
- D. System outputs:
 - 1. Individual, remote addressable output modules with form "C" contacts provide control of auxiliary equipment.
 - 2. Addressable output modules are not resettable until the system is manually reset.
 - 3. Addressable output modules are configured for programmable activation by any initiation point or grouping of initiation points.
- E. Smoke detectors and addressable output modules are shown on the drawings.
- F. All system control panels are equipped and programmed to display alarm, trouble & supervisory events via liquid crystal display (LCD) screens

1.8 CIRCUIT PATHWAY CLASSES:

- A. The system shall contain Class "B" independently supervised initiation circuits.

1.9 POWER REQUIREMENTS:

- A. The existing system provides sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of twenty-four (24) hours with 5 minutes of full connected load alarm operation at the end of this period. The system is configured to automatically transfer to the standby batteries upon power failure.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Provide fire alarm system components and devices as manufactured by one of the following manufacturers or approved equal:

1. EST (no equal to be compatible with the existing system)

2.2 FIRE ALARM CONTROL UNIT (FAC): **Existing MXL panel**

A. General items:

1. All panel functions shall be field programmed.
2. Provide all software modifications and programming needed to remove existing system devices and provide new devices as shown on the drawings.

B. The maximum time period allowable between alarm events and trouble or supervisory events reported to the Central Monitoring Station shall be as follows:

1. Alarm events: 90 seconds
2. Trouble events and supervisory events: 180 seconds

2.3 ALARM NOTIFICATION DEVICES: N/A

2.4 ADDRESSABLE DEVICE TYPES:

A. Photo-electric Smoke Detectors:

1. Photo-optic sensing chamber, UL listed to Standard 268.
2. Low voltage, 2-wire solid state design incorporating tamper proof, plug-in head assembly.
3. Tamper-resistant design.
4. Intelligent addressable design with integral addressable transponder. Detector shall utilize fuzzy logic intelligence to continually analyze the ambient conditions present and shall signal the host control panel accordingly when ALARM or TROUBLE conditions are detected.
5. Separate detector mounting base:
 - a. Molded construction equipped with terminal screws for all wiring connections, designed for mounting on any standard 4 inch square outlet box for concealed wiring, or special box for surface raceway.
6. Design to produce TROUBLE signal if detector head is removed from its mounting base and ALARM signal if detection chamber is removed.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

7. LED that blinks when sensor is being polled and glows steady when in alarm.
 8. Factory set device type code.
- B. Automatic heat detectors: Combination rate-of-rise and fixed temperature type:
1. Combination rate-of-rise and fixed temperature type (135 degrees F threshold), automatically restorable.
 2. Low voltage, 2-wire solid state design incorporating tamper proof, plug-in head assembly.
 3. Tamper-resistant design.
 4. Intelligent addressable design with integral addressable transponder. Detector shall utilize fuzzy logic intelligence to continually analyze the ambient conditions present and shall signal the host control panel accordingly when ALARM conditions are detected.
 5. Separate detector mounting base: Molded construction equipped with terminal screws for all wiring connections, designed for mounting on any standard 4" square outlet box for concealed wiring, or special box for surface raceway.
 6. Detector shall report the detector status to the control panel. The control panel shall determine whether the condition at the detector is indicative of a NORMAL, ALARM, or SENSOR TROUBLE condition.
 7. Design to produce TROUBLE signal if detector head is removed from its mounting base and ALARM signal if detection chamber is removed.
 8. LED that blinks when sensor is being polled and glows steady when in alarm.
 9. Factory set device type code.

2.5 OUTPUT MODULES:

- A. Addressable (field programmable).
- B. Supervised.
- C. Lexan coverplate.
- D. Contacts shall be form "C", rated at 2A, 24 VDC and 0.5A, 120 VAC.
- E. Where higher contact current ratings are required for the controlled device, provide heavy duty relays with proper Form "C" contact ratings slaved directly off of an output module through a supervised control circuit.
- F. Provide supervised 24VDC circuits as required, powered from the local fire alarm control panel, for activating addressable output modules and relays.
- G. Coordinate contact voltage and current ratings with voltage and current ratings of controlled devices.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

2.6 SYSTEM WIRING:

A. General:

1. Fire alarm system wiring shall be jacketed cables manufactured specifically for fire alarm system applications (600V branch circuit wiring such as THHN insulated wiring is not permitted).
2. Separation shall be maintained for circuits utilizing copper conductors as required per NFPA 70, Article 760.
3. Fire alarm system wiring connected to power limited equipment shall be FPL type cable.

B. Initiation device signaling circuit cables:

1. Cable for initiation device signaling circuits shall be solid, single pair, twisted, shielded or unshielded as recommended by the equipment manufacturer, jacketed (FPLP) and U.L. listed for its intended fire alarm application. Minimum size shall be #16AWG.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION:

A. NFPA-72 COMPLIANCE:

1. The installed fire alarm system shall meet applicable requirements of NFPA-72 for a Local Fire Alarm System.
2. Installation and testing of all fire alarm system devices, equipment and wiring shall be performed by a qualified electronics contractor licensed specifically for signal systems installation.
 - a. This Contractor shall be a factory trained representative of the equipment manufacturer and shall be licensed and authorized to install and maintain the fire alarm system approved for the installation.

B. The Contractor is responsible for assuring that conduit size and wire quantity, size, and type is suitable for the equipment supplied. The Contractor shall review the proper installation of each type of device with the equipment supplier.

C. Furnish and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. Wiring shall be installed in strict compliance with all the provisions of NEC - Article 760.

D. Except in unfinished spaces (such as mechanical rooms, equipment closets, etc.), devices shall be flush mounted where possible and surface mounted only where existing conditions will not permit flush mounting.

E. The Contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

- F. Make fire alarm wiring continuous from terminal to terminal.
- G. Protect existing automatic fire detectors during construction period as required by NFPA-72.
- H. Elevator recall control modules:
 - 1. Provide new addressable control modules for each elevator controller.
 - 2. Connect to elevator controllers and coordinate programming of primary and secondary recall functions and "fire hat" functions with elevator contractor as required to comply with applicable requirements of NFPA-72 and ANSI/ASME A17.1 - Safety Code for Elevators and Escalators.
- I. Smoke detectors: Existing

3.2 ADDRESSABLE OUTPUT MODULES

- A. Addressable output modules shall be installed within 24 inches of their associated devices to be controlled and in a readily accessible location.
- B. Verify locations of interface points with existing systems in the field with the owner prior to conduit rough-in.
- C. Provide addressable output module interfaces for systems including but not limited to the following:
 - 1. Elevator recall functions.

3.3 PROGRAMMING

- A. The system installer shall verify existing programming and shall provide new programming as required to provide proper elevator recall functions per NFPA-72 and as required by the installing elevator vendor's requirements for site-specific conditions.
- B. All programming changes required by the Owner to render the system usable and functional by the Owner's standards shall be made at the contractor's expense.

3.4 TESTING, GUARANTEE, SERVICE:

- A. Provide initial certification testing of the system in accordance with the procedures outlined in NFPA 72. The minimum required tests are as follows:
 - 1. Verify the absence of unwanted voltages between circuit conductors and ground.
 - 2. Test all conductors for short circuits utilizing an insulation testing device.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3. Verify the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
 4. Test each affected initiating signaling circuit. .
 5. Test each existing smoke detector, heat detector, and each existing new elevator recall output module for all specified functions in accordance with the manufacturer's operating and maintenance manual.
 6. **Test all elevator control functions in the presence of the elevator contractor's checkout and testing technician.**
- B. An NFPA-72 Record of Completion form is not required for this project as only existing elevator control modules are being replaced (1-for-1) and no devices are being added to the system. All pre-existing system functions remain intact and are not being changed.
- C. Upon completion of each phase, the Contractor shall conduct a functional test of for the Authority Having Jurisdiction, Owner and Engineer.
1. Additional testing and demonstration for the Authority Having Jurisdiction, Owner and Engineer shall be provided as required until the system is demonstrated to be free of unexplained alarms, troubles, faults, or any abnormalities.
- D. All components, parts and assemblies supplied by the manufacturer shall be guaranteed by the manufacturer against defects in materials and workmanship for a period of three (3) years. The equipment manufacturer shall provide normal labor service as required during this period at no cost to the Owner and shall respond to any call within four (4) hours, 24 hours a day, seven days per week.
- E. The equipment manufacturer shall have a local branch office or authorized factory distributor staffed with trained, full-time employees who are capable of performing testing, inspection, repair and maintenance services for the life of the fire alarm system.
- 3.5 COMPLETION:
- A. Upon completion of the work, remove excess debris, materials, equipment, apparatus, tools and the like and leave the premises clean, neat and orderly.
- B. Certification:
1. Although an NFPA-72 Record of Completion form is not required, the contractor shall certify in a letter to the Engineer that the complete system has been installed and checked in accordance with the required and applicable NFPA-72 testing standards and the contract documents and that all items have been labeled.

COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION & RENOVATION

3.6 SPARE PARTS: N/A

3.7 KEYS: N/A

END OF SECTION

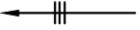
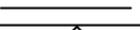
ELECTRICAL DEMOLITION LEGEND

SYMBOL	DESCRIPTION
	EXISTING TO BE REMOVED (TYPICAL)
	EXISTING TO REMAIN (TYPICAL)
	EXISTING TO BE REMOVED AND REPLACED WITH NEW (TYPICAL)

Panel: PLE		AIC (symm amperes): 10,000														
Mains: 100A MCB		Mounting: SURFACE														
Voltage: 120/208Y, 3 PHASE 4 WIRE																
DESCRIPTION	CON	Ø	N	G	TRIP	POLES	#	Ø	#	POLES	TRIP	CON	Ø	N	G	DESCRIPTION
VO RECEP 4TH FL	3/4	12	12	12	20	1P	1	A	2	1P	20	3/4	12	12	12	P-HOUSE RECEP
VO RECEP 5TH FL	3/4	12	12	12	20	1P	3	B	4	1P	20	3/4	12	12	12	P-HOUSE RECEP
VO RECEP 6TH FL	3/4	12	12	12	20	1P	5	C	6	1P	20	3/4	12	12	12	CTRLS-ELEV 1,2,3
ELEV #1 CAR LTG	3/4	12	12	12	20	1P	7	A	8	1P	20	3/4	12	12	12	RECEP-RADIO RM
ELEV #2 CAR LTG	3/4	12	12	12	20	1P	9	B	10	1P	20	3/4	12	12	12	LTG-EXTERIOR
ELEV #3 CAR LTG	3/4	12	12	12	20	1P	11	C	12	--	--	--	--	--	--	SPACE
ODAC-2/DAC-2	3/4	10	10	10	30	2P	13	A	14	--	--	--	--	--	--	SPACE
		10					15	B	16	--	--	--	--	--	--	SPACE
ODAC-1/DAC-1	3/4	10	10	10	30	2P	17	C	18	--	--	--	--	--	--	SPACE
		10					19	A	20	--	--	--	--	--	--	SPACE
EUH-1	3/4	12	12	12	20	2P	21	B	22	--	--	--	--	--	--	SPACE
		12					23	C	24	--	--	--	--	--	--	SPACE
SPARE					20	1P	25	A	26	--	--	--	--	--	--	SPACE
SPARE					20	1P	27	B	28	--	--	--	--	--	--	SPACE
SPARE					20	1P	29	C	30	--	--	--	--	--	--	SPACE
SPARE					20	1P	31	A	32	--	--	--	--	--	--	SPACE
SPARE					20	1P	33	B	34	--	--	--	--	--	--	SPACE
SPARE					20	1P	35	C	36	--	--	--	--	--	--	SPACE
SPARE					20	1P	37	A	38	--	--	--	--	--	--	SPACE
SPARE					20	1P	39	B	40	--	--	--	--	--	--	SPACE
SPARE					20	1P	41	C	42	--	--	--	--	--	--	SPACE

REMARKS:
 1. FIELD-VERIFY ALL EXISTING CIRCUITS.
 2. ODAC-2/DAC-2 CONNECTIONS IN BASE BID.
 3. ODAC-1/DAC-1 & EUH-1 CONNECTIONS IN HVAC ALTERNATE.
 4. PROVIDE INTEGRAL TYPE 1 OR TYPE 2 MOV. TYPE SPD DEVICE. MAX 700V VPR (L-N), MAX SURGE CURRENT RATING-80,000A/PH.

ELECTRICAL SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
	SEPARATELY ENCLOSED CIRCUIT BREAKER W/GND LUG AND S/NEUTRAL
ATS 	AUTOMATIC TRANSFER SWITCH
	DRY TYPE TRANSFORMER
	ELECTRICAL PANELBOARD, 480/277V
	ELECTRICAL PANELBOARD, 120/208V
	MOTOR LOAD
	DISCONNECT SWITCH
	JUNCTION BOX
	FIRE ALARM ADDRESSABLE CONTROL MODULE
	20A, 125V DUPLEX GFI RECEPTACLE IN SURFACE TYPE METAL BOX. WP INDICATES WEATHER PROOF TYPE.
	20A, 125V SIMPLEX RECEPTACLE IN SURFACE METAL BOX
	SPST, 20A, 277V LIGHT SWITCH
	WALL MOUNTED ELEVATOR PIT LIGHT
	TELEPHONE JACK
C.	CONDUIT
CB	CIRCUIT BREAKER
XFMR	TRANSFORMER
CKT	CIRCUIT
PH	PHASE
AFF	ABOVE FINISHED FLOOR
XFMR	TRANSFORMER
•	CONDUIT RUN, VERTICAL-DOWN
◦	CONDUIT RUN, VERTICAL-UP
	CONDUIT - HOMERUN, TICK MARKS INDICATE NUMBER OF PHASE OR NEUTRAL CONDUCTORS
	CONDUIT RUN CONCEALED OVERHEAD OR EXPOSED
	KEYNOTE LABEL

LIGHTING FIXTURE SCHEDULE

APPLICATION	MANUFACTURER	CATALOG NUMBER	FINISH	LAMPS				VOLTAGE	DESCRIPTION
				QTY.	TYPE	LUMENS	WATTS		
ELEVATOR MACHINE ROOM	COLUMBIA (OR APPROVED EQUAL)	47S-4-2-32-E-U-DR12	WHITE	2	T8	3100	32	UNIV (120-277)	4' INDUSTRIAL SURFACE VAPORTIGHT FIXTURE. IMPACT RESISTANT PRISMATIC LENS. ENERGY EFFICIENT, THERMALLY PROTECTED, AUTOMATIC RESETTING, INSTANT START, HPF, CLASS P, SOUND RATING-A, ELECTRONIC BALLAST.
ELEVATOR PIT	HUBBELL (OR APPROVED EQUAL)	VSL-1630-V2-S-G-W	CAST METAL	Lot	LED	1625	16	120	INDUSTRIAL HIGH ABUSE LED FIXTURE. 3/4" C. ELBOW BRACKET. GLASS GLOBE. WIRE GUARD. WHITE OPTICS.

ORIGINAL CONSTRUCTION DRAWINGS WERE NOT AVAILABLE FROM THE OWNER FOR DESIGN. ALL FLOOR PLANS AND EXISTING EQUIPMENT SHOWN ARE BASED ON CASUAL FIELD MEASUREMENTS AND BING MAPPING. ACCORDINGLY, ACCURACY AND SCALES OF FLOOR PLANS ARE APPROXIMATE, BUT SUFFICIENT FOR BIDDING PURPOSES.

THE SUCCESSFUL BIDDER IS RESPONSIBLE FOR FIELD-VERIFYING ALL WORK AND TAKING ALL FIELD MEASUREMENTS REQUIRED TO VERIFY CONSTRUCTION PRIOR TO ORDERING OF MATERIAL.



Revisions		
1	AMENDMENT 2	11/17/2014

Sheet Title: ELECTRICAL NOTES & SCHEDULES Project: COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION	Sheet Number: <h1 style="font-size: 2em;">E0.1</h1>
BGA Comm. No: 14093 Date: 11/17/2014 Scale: N/A	

GENERAL ELECTRICAL NOTES:

1. ALL WORK SHOWN ON THE ELECTRICAL DRAWINGS SHALL BE FURNISHED AND INSTALLED AS NEW WORK UNLESS OTHERWISE INDICATED.
2. SEE DIVISION 26 AND DIVISION 28 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. ALL DISCONNECT SWITCHES FOR ELEVATOR CAR POWER AND ELEVATOR CAR LIGHTING SHALL BE LABELED (RE: SPECIFICATION 26 0501) WITH IN ACCORDANCE WITH 2011 NEC 620.51(D).

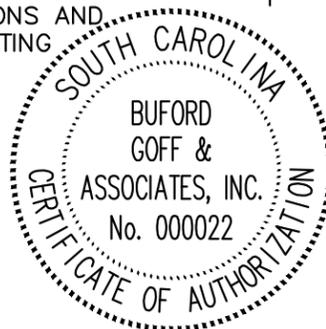
ELECTRICAL PLAN KEYNOTES:

1. REPLACE ALL EXISTING SMOKE AND HEAT DETECTORS AND BASES IN THE ELEVATOR MACHINE ROOM WITH NEW ADDRESSABLE LIKE DEVICES. REMOVE ALL SMOKE AND HEAT DETECTORS AND BASES FROM THE TOP AND BOTTOM OF BOTH UNSPRINKLERED ELEVATOR HOISTWAYS AND PROVIDE BLANK COVERS OVER ABANDONED BOXES. LABEL EACH DEVICE COVER PLATE WITH PERMANENT MARKING PEN "FUTURE FIRE DETECTOR". THESE DEVICES ARE PROHIBITED BY 2010 NFPA-72, PART 21.3.6.
2. ELEVATOR MOTORS AND CONTROLS: REMOVAL OF EXISTING AND FURNISHING AND INSTALLATION OF NEW ELEVATOR MOTORS AND CONTROLS SHALL BE PROVIDED BY THE ELEVATOR CONTRACTOR. REMOVAL OF ALL FEEDERS AND ELECTRICAL CONNECTIONS SHALL BE BY THE ELECTRICAL CONTRACTOR.
3. ELEVATOR CAR POWER DISCONNECT: HEAVY DUTY FUSIBLE, NEMA 1-60A-480V-3P-GND LUG. PROVIDE FUSES OF TYPE, CLASS AND SIZE PER ELEVATOR VENDOR'S SPECIFICATIONS.
4. ELEVATOR CAR LIGHTING DISCONNECT: HEAVY DUTY FUSIBLE, NEMA 1-30A-240V-2P-GND LUG. PROVIDE BUSSMAN CLASS CC TYPE FNQ 20A FUSES WITH COMPATIBLE FUSE HOLDERS.
5. LEAVE (3) EXISTING ADDRESSABLE C-MODULES AS SPARES AND REPLACE (3) EXISTING ADDRESSABLE C-MODULES WITH NEW LIKE ADDRESSABLE C-MODULES. PROVIDE CIRCUIT FROM EACH C-MODULE IN 3/4" C AND TO THE DESIGNATED "MASTER" ELEVATOR CONTROLLER FOR PRIMARY AND SECONDARY RECALL SIGNALING. COORDINATE WITH THE ELEVATOR EQUIPMENT INSTALLER FOR CONNECTIONS AND PROVIDE ALL PRETESTING AND ACCEPTANCE TESTING REQUIRED TO DEMONSTRATE PROPER RECALL FUNCTIONS TO THE AHJ, OWNER AND ENGINEER.

6. REMOVE ALL EXISTING LIGHT FIXTURES, RECEPTACLES, LIGHT SWITCHES, AND ASSOCIATED ELECTRICAL BRANCH CIRCUITING FROM BOTH EXISTING ELEVATOR PITS (CONDUIT MAY BE REUSED WHERE POSSIBLE).
7. PROVIDE NEW BRANCH CIRCUITS FOR ELEVATOR PIT LIGHTING & RECEPTACLES. OBTAIN NEW ROUGH-IN HEIGHTS AND LOCATIONS OF ALL NEW LIGHT FIXTURES AND WIRING DEVICES FROM THE ELEVATOR EQUIPMENT INSTALLER AND ELEVATOR SHOP DRAWINGS AND CONFIRM WITH THE ENGINEER PRIOR TO ROUGH-IN. EXISTING BRANCH CIRCUIT CONDUIT HOMERUNS MAY BE REUSED WHERE POSSIBLE. HOWEVER, PROVIDE ALL NEW WIRING (2#12, #12 GND) PER CIRCUIT AND PROVIDE NEW RACEWAY SYSTEM IN PIT AS REQUIRED TO ACCOMMODATE NEW LIGHT FIXTURE AND NEW WIRING DEVICE LOCATIONS.
8. PROVIDE NEW PIT LIGHT FIXTURES (SEE LIGHTING FIXTURE SCHEDULE) AND BRANCH CIRCUITING (2#12, #12 GND, 3/4" C.). CONNECT ALL PIT LIGHTING AHEAD OF GFI RECEPTACLES.
9. RECONNECT EXISTING TELEPHONE STATION CABLE TO ALL NEW ELEVATOR CONTROLLERS AND COORDINATE WITH THE OWNER'S TELEPHONE VENDOR AND THE ELEVATOR EQUIPMENT INSTALLER AS REQUIRED TO ESTABLISH FUNCTIONAL TELEPHONE SERVICE. PROVIDE RJ-11 JACKS AT ELEVATOR CONTROLLERS.
10. PROVIDE NEW DEDICATED 20A, 120V ELEVATOR CONTROL POWER CIRCUIT FROM PANEL "PLE".
11. PROVIDE NEW NON-GFCI, 20A, 125V SIMPLEX RECEPTACLE ADJACENT TO AND WITHIN 24" OF ELEVATOR SUMP.
12. REMOVE ALL EXISTING FLUORESCENT STRIP FIXTURES AND PROVIDE (9) NEW VAPORTIGHT FLUORESCENT LIGHT FIXTURES (SEE LIGHTING FIXTURE SCHEDULE) AND BRANCH CIRCUITING (2#12, #12 GND, 3/4" C.).
13. FIELD VERIFY FUNCTION AND USE OF NOTED EQUIPMENT. REMOVE IF EQUIPMENT IS NO LONGER IN SERVICE.
14. EXISTING HVAC UNIT AND CONNECTIONS RELOCATED & REWORKED IN BASE BID. REMOVE ALL ELECTRICAL EQUIPMENT AND BRANCH CIRCUITING ASSOCIATED WITH EXISTING HVAC UNIT IN HVAC ALTERNATE BID.
15. REMOVE ALL LIGHT FIXTURES, ELECTRICAL DEVICES AND ASSOCIATED BRANCH CIRCUITING FROM NOTED SPACE.

16. PROVIDE NEW DEDICATED 20A, 120V CIRCUIT (2#12, #12 GND, 3/4" C.) FROM PANEL BERPS. PROVIDE 20A, 1P CB IN PANEL FOR CIRCUIT. UPDATE PANELBOARD INDEX.
17. DO NOT SCALE PLAN FOR LIGHT SWITCH LOCATION. COORDINATE WITH ELEVATOR EQUIPMENT INSTALLER TO LOCATE SWITCH IMMEDIATELY ADJACENT TO PIT LADDER 48" ABOVE BASEMENT FLOOR LEVEL.
18. PROVIDE NEW FEEDER (3#3, #8 GND, 1-1/4" C.) FROM PANEL "PHA". REMOVE EXISTING 3P SPARE CB BELOW CB FOR PUMP P3 AND PROVIDE NEW 80A, 3P CB TO ACCOMMODATE NEW CB. TRIP AND FAULT CURRENT RATINGS OF NEW CB SHALL MATCH EXISTING CB RATINGS IN PANEL "PHA".
19. PROVIDE NEW 3#3 AWG, #8 GND, 1-1/4" C. ELEVATOR CAR FEEDER FROM PANEL "PHA" AND EXTEND TO NEW CONTROLLER AND MOTOR.
20. PROVIDE NEW 3#3 AWG, #8 GND, 1-1/4" C. ELEVATOR CAR FEEDER FROM PANEL "PHE" AND EXTEND TO NEW CONTROLLER AND MOTOR.
21. OUTDOOR HVAC UNIT DISCONNECT: HEAVY DUTY NON-FUSIBLE-NEMA 3R-30A-240V-2P-SOLID NEUTRAL-GND LUG.
22. UNIT HEATER DISCONNECT: HEAVY DUTY NON-FUSIBLE-NEMA 1-30A-240V-2P-SOLID NEUTRAL-GND LUG.
23. OUTDOOR/INDOOR HVAC UNIT DISCONNECT: HEAVY DUTY FUSIBLE-NEMA 1-30A-240V-2P-SOLID NEUTRAL-GND LUG. PROVIDE BUSSMAN CLASS CC DUAL ELEMENT/TIME DELAY 30A FUSES.
24. IDAC UNIT WIRED FROM ODAC UNIT BY HVAC CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE 3/4" C. BETWEEN ODAC AND IDAC UNITS.

Revisions		
1	AMENDMENT 2	11/17/2014



Sheet Title: ELECTRICAL NOTES

Project: COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION

Sheet Number: E0.2

BGA Comm. No: 14093
Date: 11/17/2014
Scale: N/A

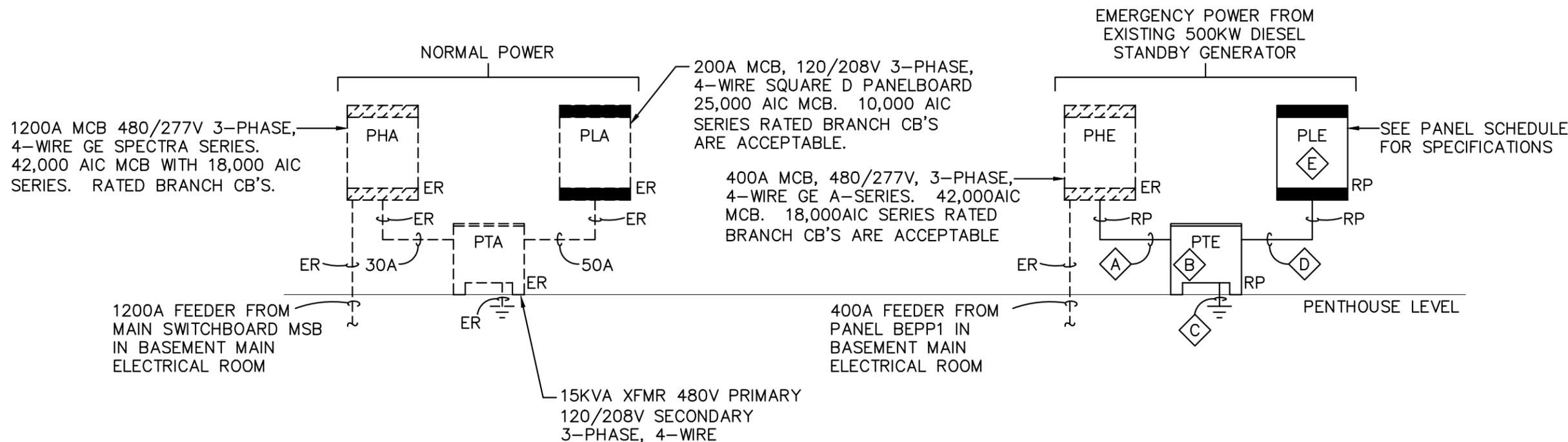
KEYNOTES – POWER RISER:

- A** REMOVE EXISTING PRIMARY FEEDER AND CB. PROVIDE NEW FEEDER (3#6, #10 GND, 1" C.) AND NEW 50A, 3P CB. TRIP AND FAULT CURRENT RATINGS OF NEW CB SHALL MATCH EXISTING CB RATINGS IN PANEL "PHE".
- B** REMOVE EXISTING 15KVA, K-13 TRANSFORMER AND PROVIDE NEW STANDARD DRY TYPE TRANSFORMER RATED: 30KVA, 480V PRIMARY, 120/208V SECONDARY, 3PH, 4-WIRE. REMOVE EXISTING TRANSFORMER LABELING AND REINSTALL ON NEW TRANSFORMER WITH INDUSTRIAL ADHESIVE. PROVIDE NEW UNISTRUT-FABRICATED BASE TO OVERLAP AND EXTEND EXISTING CONCRETE FOUNDATION. BOLT NEW BASE TO FLOOR AND TRANSFORMER TO UNISTRUT BASE TO MEET APPLICABLE SEISMIC REQUIREMENTS (CONSULT MANUFACTURER).

- C** RECONNECT EXISTING GROUNDING ELECTRODE CONDUCTOR TO NEW TRANSFORMER GROUND LUG.
- D** REMOVE EXISTING SECONDARY FEEDER AND PROVIDE NEW FEEDER (4#1, #8 GND, 1-1/2" C.).
- E** REMOVE EXISTING PANEL "PLE" AND PROVIDE NEW SPD-PROTECTED REPLACEMENT PANELBOARD (SEE PANEL SCHEDULE). RECONNECT/EXTEND ALL EXISTING BRANCH CIRCUITS TO NEW REPLACEMENT BRANCH CIRCUIT CB'S.

GENERAL NOTES – POWER RISER:

1. EQUIPMENT AND FEEDERS SHOWN IN DASHED LINE TYPE ARE EXISTING.
2. EQUIPMENT AND FEEDERS SHOWN IN SOLID LINE TYPE ARE NEW.



1 PARTIAL PENTHOUSE POWER RISER DIAGRAM
 E0.3 SCALE: N.T.S.

Revisions		
1	AMENDMENT 2	11/17/2014



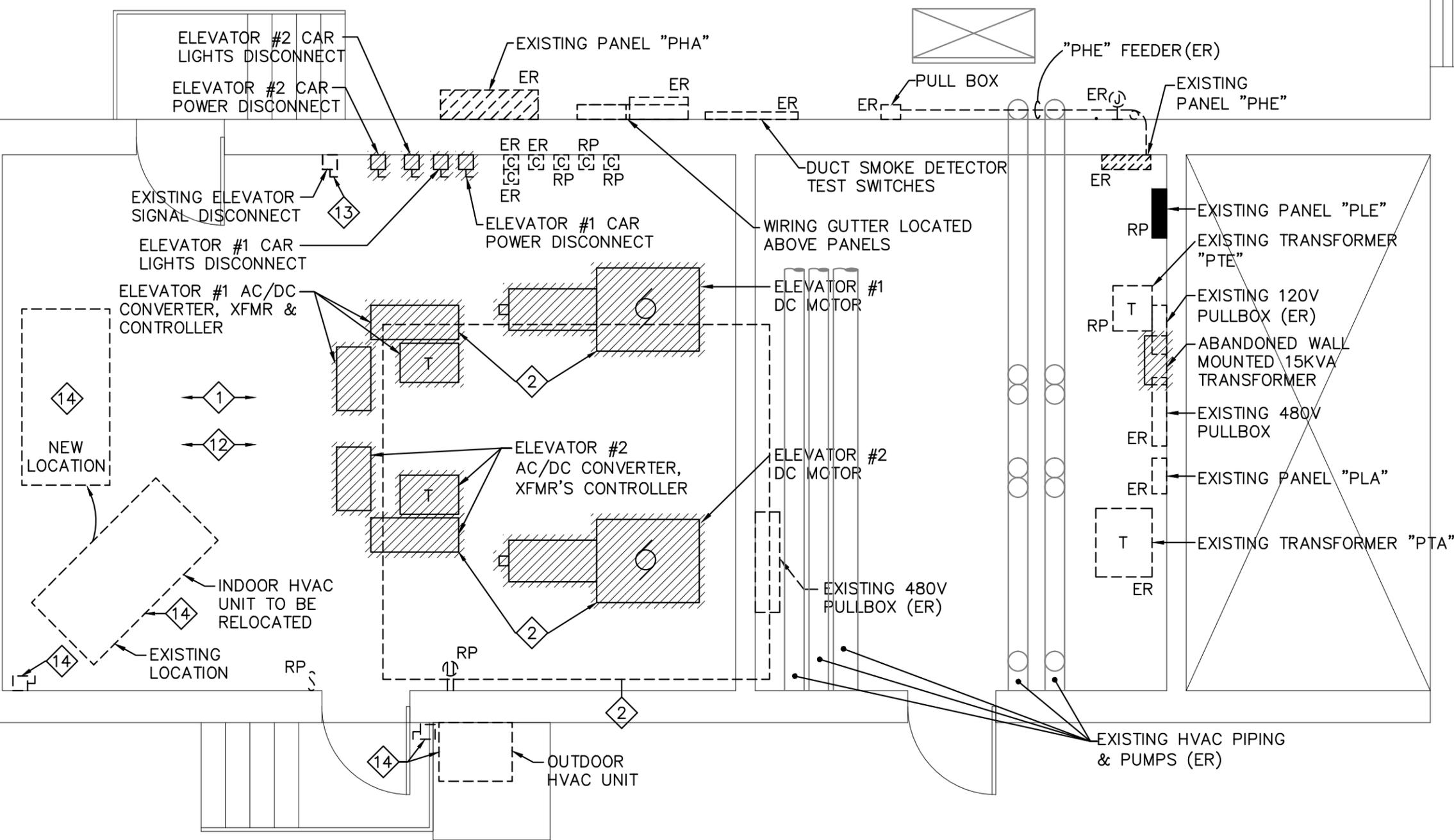
Buford Goff
 & Associates, Inc.
 Engineers & Planners

Sheet Title: PARTIAL PENTHOUSE POWER RISER DIAGRAM
 Project: COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION

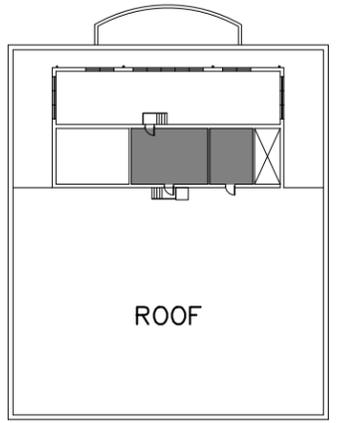
Sheet Number: **E0.3**
 BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: N/A

GENERAL NOTES:

1. REMOVE ALL EXISTING ELEVATOR CAR POWER FEEDERS.
2. REMOVE ALL EXISTING CAR LIGHTING BRANCH CIRCUITS.



KEY PLAN



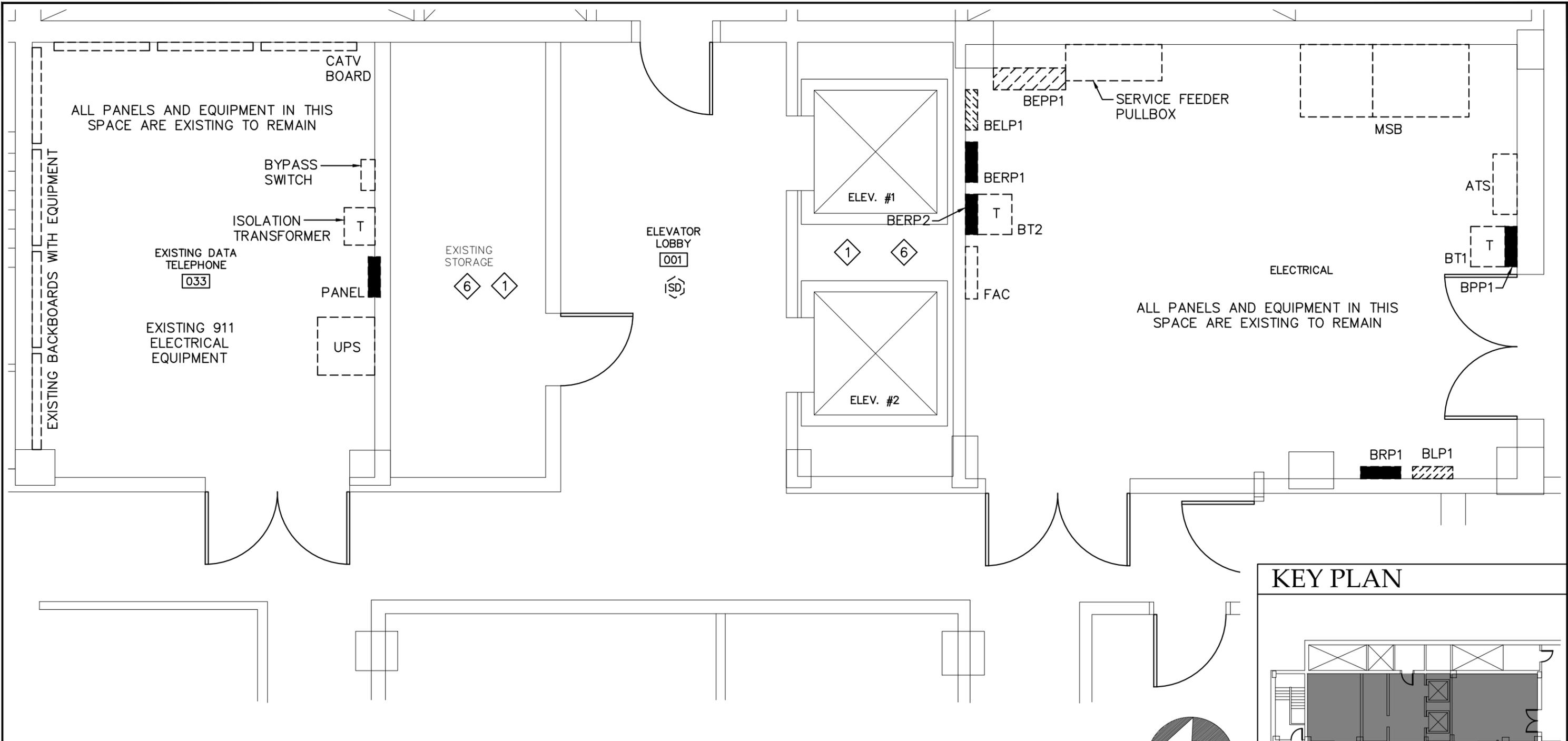
1 PENTHOUSE ELEV. MACH./ELEC. ROOM DEMOLITION PLAN - ELECTRICAL
 E1.0 SCALE: 1/4" = 1'-0"



Sheet Title: PENTHOUSE ELEV. MACH./ELEC. ROOM DEMOLITION PLAN - ELECTRICAL
 Project: COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION

Sheet Number: **E1.0**
 BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: 1/4" = 1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014



1 BASEMENT PARTIAL DEMOLITION PLAN - ELECTRICAL
 E1.1 SCALE: 1/4" = 1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014



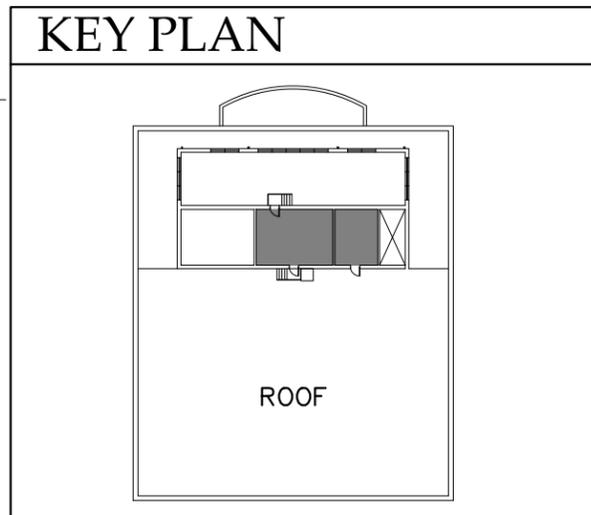
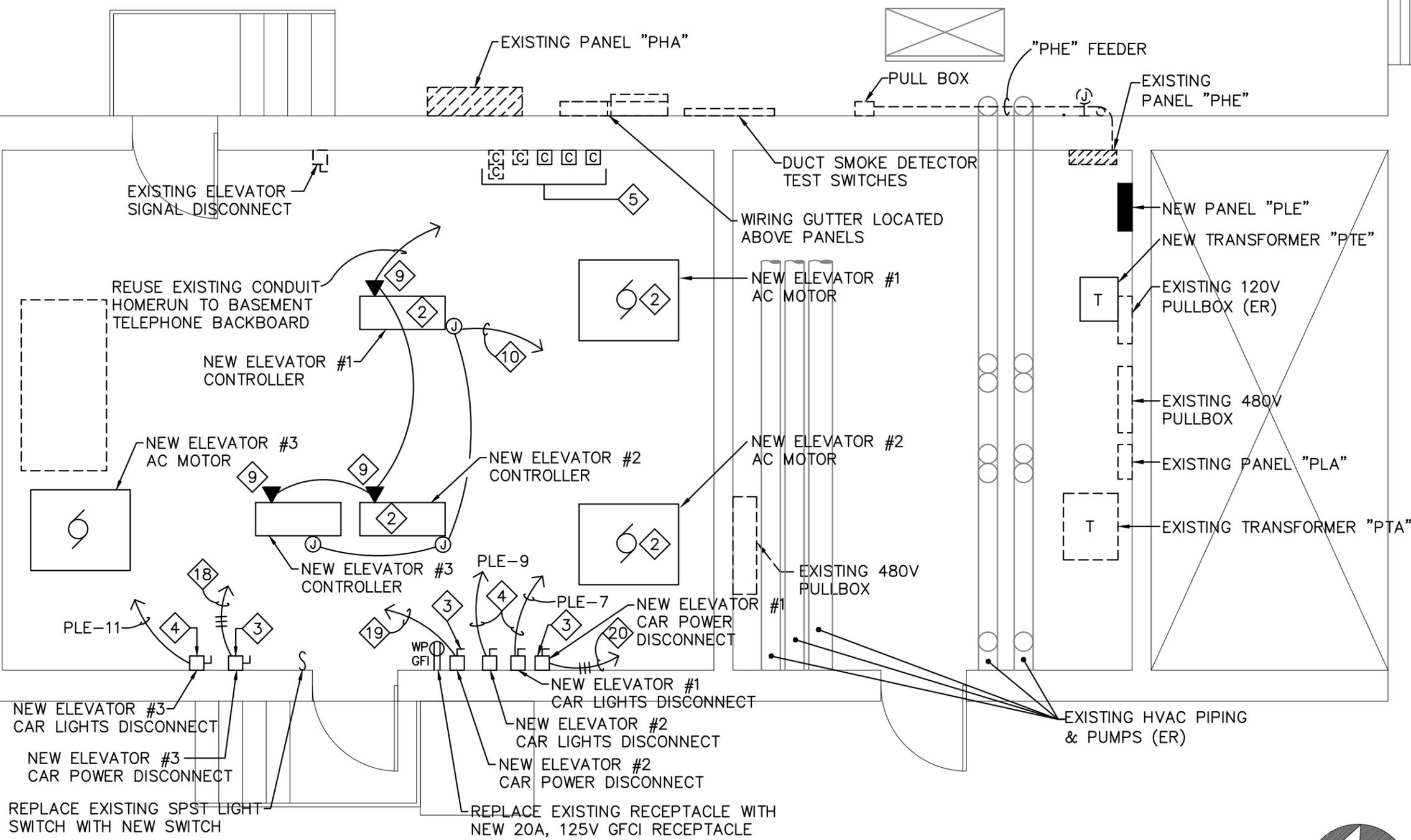
Buford Goff
 & Associates, Inc.
 Engineers & Planners

Sheet Title:
 BASEMENT PARTIAL DEMOLITION PLAN - ELECTRICAL

Project:
 COUNTY OF LEXINGTON
 ADMINISTRATION BUILDING ELEVATORS:
 INSTALLATION AND RENOVATION

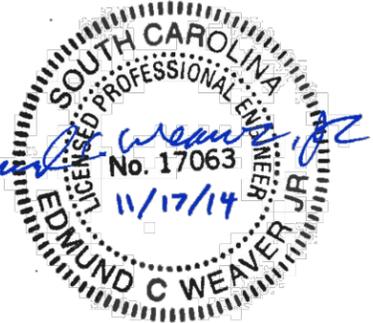
Sheet Number:
E1.1

BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: 1/4" = 1'-0"



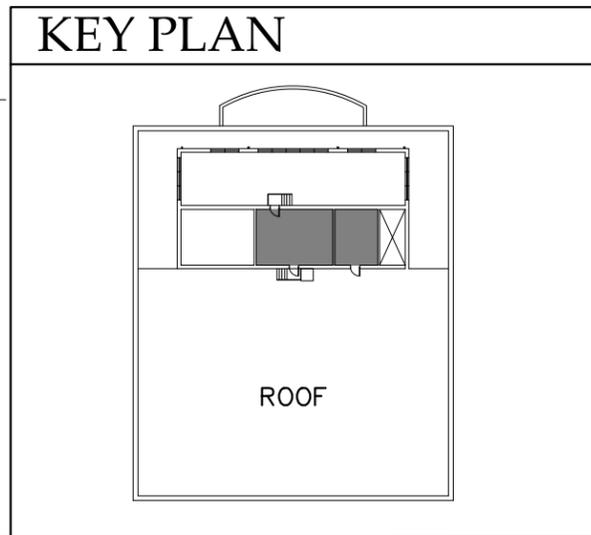
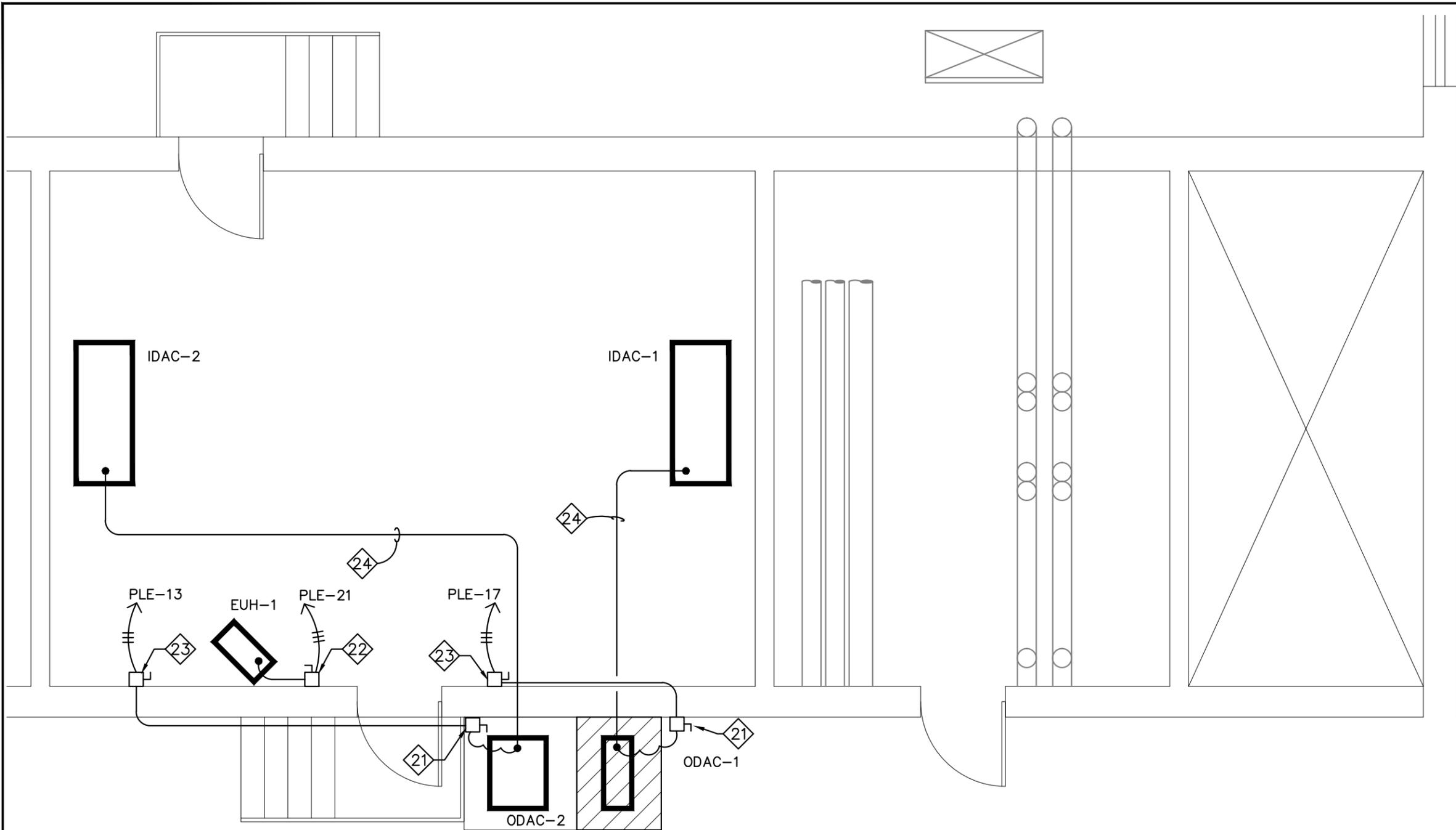
1 PENTHOUSE ELEV. MACH./ELEC. ROOM RENOVATION PLAN - ELECTRICAL
 E2.0 SCALE: 1/4" = 1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014



Sheet Title: PENTHOUSE ELEV. MACH./ELEC. ROOM RENOVATION PLAN - ELECTRICAL
 Project: COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION

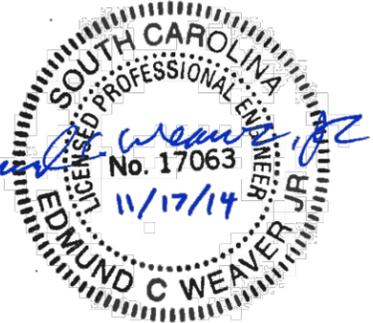
Sheet Number: **E2.0**
 BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: 1/4" = 1'-0"



1 ENLARGED ELECTRICAL ROOM PLAN - HVAC ELECTRICAL
 E3.0 SCALE: 1/4" = 1'-0"



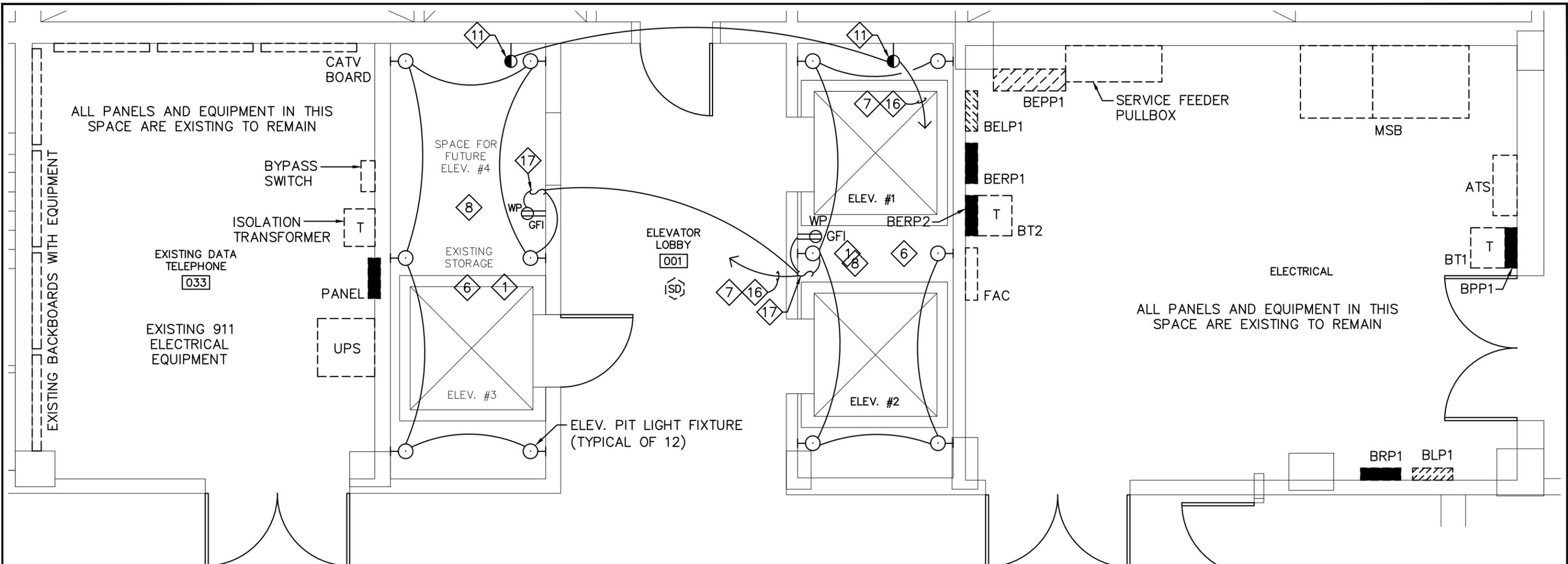
Revisions		
1	AMENDMENT 2	11/17/2014



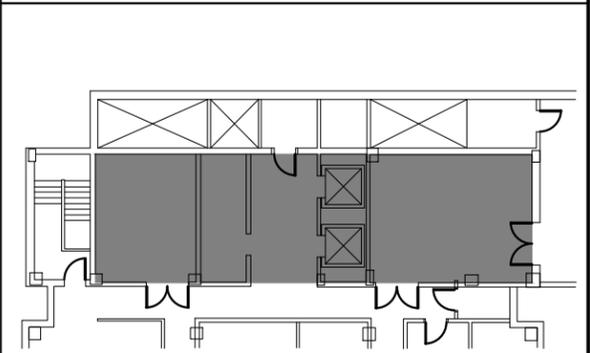
Buford Goff
 & Associates, Inc.
 Engineers & Planners

Sheet Title: ENLARGED ELECTRICAL ROOM PLAN - HVAC ELECTRICAL
 Project: COUNTY OF LEXINGTON
 ADMINISTRATION BUILDING ELEVATORS:
 INSTALLATION AND RENOVATION

Sheet Number:
E3.0
 BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: 1/4" = 1'-0"

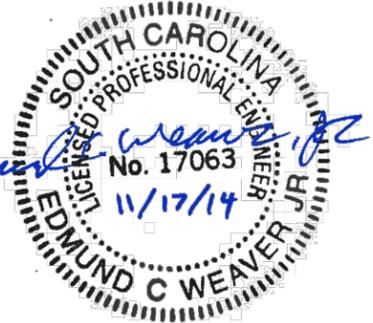


KEY PLAN



1 BASEMENT PARTIAL RENOVATION PLAN - ELECTRICAL
 E4.0 SCALE: 1/4" = 1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014



Buford Goff
 & Associates, Inc.
 Engineers & Planners

Sheet Title:
BASEMENT PARTIAL RENOVATION PLAN - ELECTRICAL

Project:
**COUNTY OF LEXINGTON
 ADMINISTRATION BUILDING ELEVATORS:
 INSTALLATION AND RENOVATION**

Sheet Number:
E4.0

BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: 1/4" = 1'-0"

SPLIT SYSTEM AIR CONDITIONING UNIT SCHEDULE (DUCTLESS)

INDOOR UNIT										OUTDOOR UNIT									
INDOOR AC #	CFM		EXT * SP(a)	HP	ELECTRIC HEAT		MAX. WEIGHT #	ELECTRIC		MANUFACTURER AND MODEL	OUTDOOR AC #	FANS		COMPRESSOR		MAX. WEIGHT #	ELECTRIC		
	TOT	OA			KW	VOLT/PH		MCA	VOLT/PH			HP	NO	NO	RLA		MCA	MOCP	VOLT/PH
IDAC-1,2	705	-	0	95W	-	-	100	1	208/230/1	MITSUBISHI PCA-A30	ODAC-1,2	75W	1	1	12	30	25	40	208/230/1

(a) INCHES WG (b) @ ARI CONDITIONS

① PROVIDE START CAPACITOR FOR SINGLE PHASE UNITS ② LOW AMBIENT CONTROL TO 0°F ③ POWER INDOOR UNIT FROM OUTDOOR UNIT ④ CEILING MOUNTED INDOOR UNIT

CONTINUATION

SPLIT SYSTEM AIR CONDITIONING UNIT SCHEDULE (DUCTLESS)

MANUFACTURER AND MODEL	COOLING COIL CAPACITY								REMARKS
	MBH (NET)		OUTDOOR DB T	ENT AIR		LVG AIR		SEER(b)	
	TOT	SENS		DB	WB	DB	WB		
MITSUBISHI PUY-A30	42	-	95	80	67	-	-	14.5	①②③④

SEISMIC AND WIND DESIGN CRITERIA

SEISMIC DESIGN CATEGORY: D

SEISMIC OCCUPANCY CATEGORY: III

DESIGN WIND SPEED: 125 MBH

ORIGINAL CONSTRUCTION DRAWINGS WERE NOT AVAILABLE FROM THE OWNER FOR DESIGN. ALL FLOOR PLANS AND EXISTING EQUIPMENT SHOWN ARE BASED ON CASUAL FIELD MEASUREMENTS AND BING MAPPING. ACCORDINGLY, ACCURACY AND SCALES OF FLOOR PLANS ARE APPROXIMATE, BUT SUFFICIENT FOR BIDDING PURPOSES.

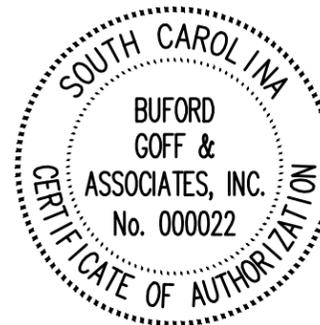
THE SUCCESSFUL BIDDER IS RESPONSIBLE FOR FIELD-VERIFYING ALL WORK AND TAKING ALL FIELD MEASUREMENTS REQUIRED TO VERIFY CONSTRUCTION PRIOR TO ORDERING OF MATERIAL.

ELECTRIC UNIT HEATER SCHEDULE

HEATER #	LOCATION	CFM	KW	MTG HEIGHT (a)	MAX. WEIGHT #	HP	ELECT VOLT/PH	MANUFACTURER AND MODEL	REMARKS
EUH-1	ELEV. MACH. RM.	400	3.3	8	50	1/125	208/1	MARKEL SERIES 5100	①②③④

(a) FEET AFF TO BOTTOM OF UNIT

① HORIZONTAL ② DISCONNECT SWITCH ③ WALL BRACKET ④ WALL MTD 24V T'STAT

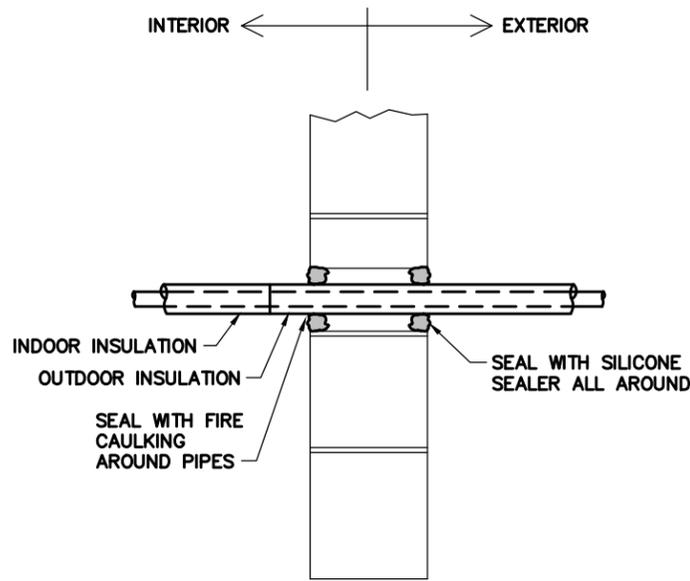


Buford Goff
& Associates, Inc.
Engineers & Planners

Sheet Title: HVAC SCHEDULES
Project: COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION

Sheet Number: M0.1
BGA Comm. No: 14093
Date: 11/17/2014
Scale: 1/4"=1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014



NOTE:

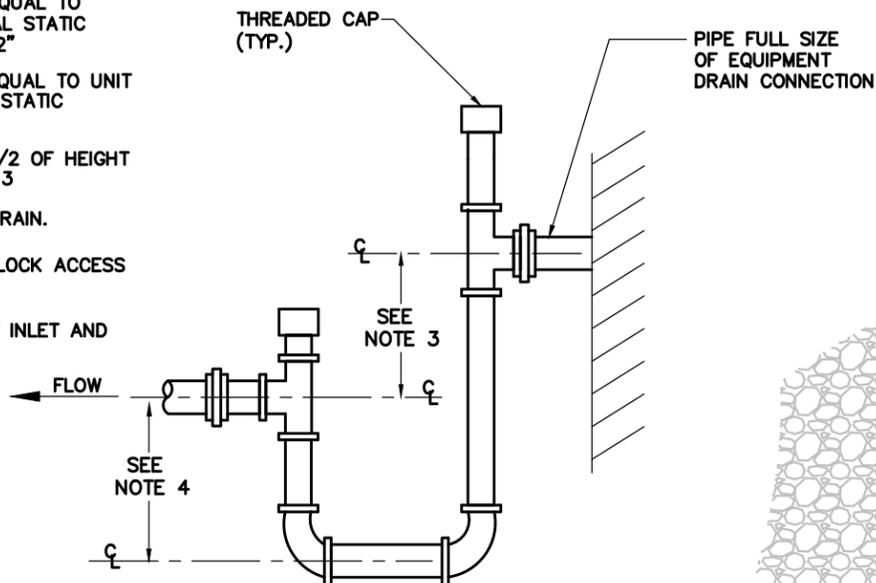
1. WHERE DIFFERENT INSULATION IS SPECIFIED FOR INDOOR AND OUTDOOR PIPING, OUTDOOR INSULATION SHOULD EXTEND JUST INSIDE THE BUILDING.

INSULATED PIPE THROUGH EXTERIOR WALL DETAIL

3178D NOT TO SCALE 5/10

NOTES:

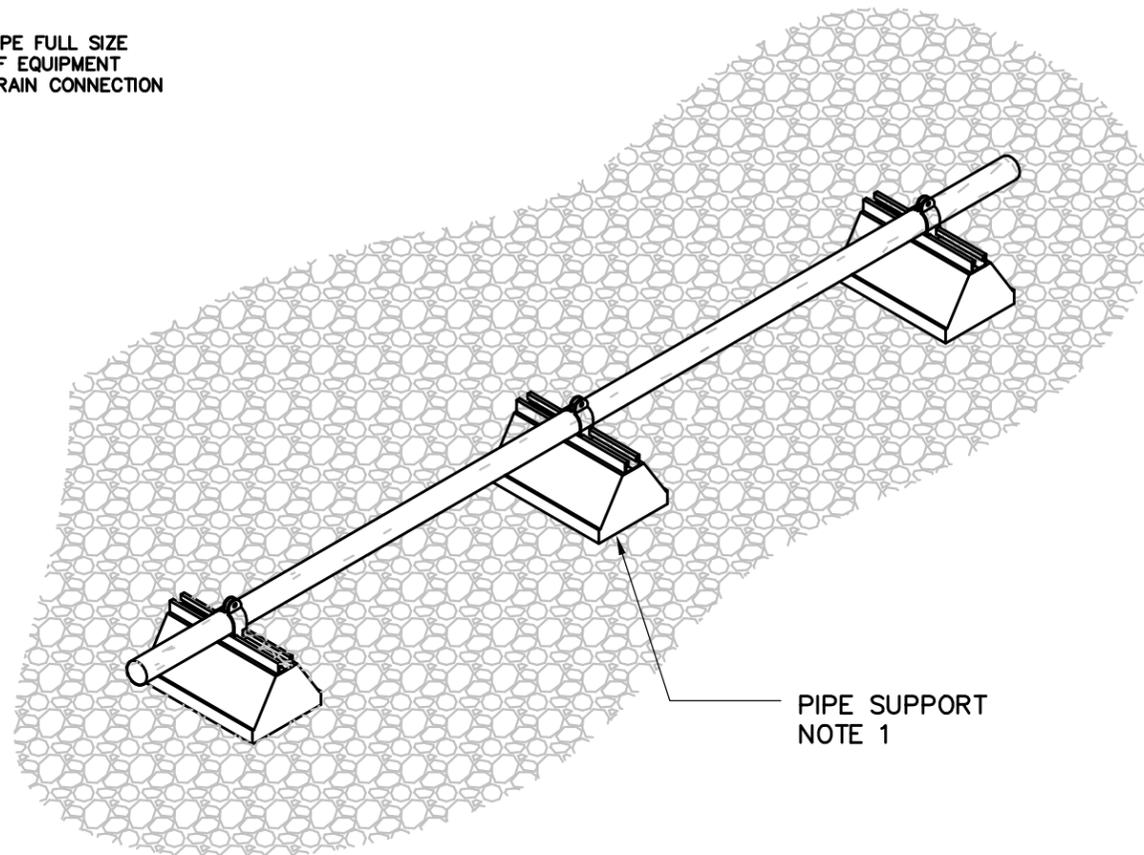
1. LOCATE TRAPS SO AS TO BE ACCESSIBLE FOR CLEANING.
2. HEIGHT SHALL BE EQUAL TO UNIT MAXIMUM TOTAL STATIC PRESSURE PLUS 1/2"
3. HEIGHT SHALL BE EQUAL TO UNIT MAXIMUM NEGATIVE STATIC PRESSURE PLUS 1"
4. HEIGHT SHALL BE 1/2 OF HEIGHT INSTALLED IN NOTE 3
5. PIPE TO NEAREST DRAIN.
6. TRAP SHALL NOT BLOCK ACCESS TO EQUIPMENT.
7. PROVIDE UNIONS AT INLET AND OUTLET OF TRAP.



DRAW THRU DRAIN

EQUIPMENT CONDENSATE DRAIN DETAIL

3179B NOT TO SCALE 8/03



NOTES:

1. PROVIDE SUPPORT 4 FT ON CENTER.
2. SEE SPECIFICATIONS FOR SUPPORT REQUIREMENTS.

EQUIPMENT DRAIN PIPE SUPPORT ON ROOF DETAIL

3179C NOT TO SCALE 5/10

NOTES:

1. DETAIL IS FOR ALL DEVICES THAT REQUIRE ACCESS BY BUILDING OCCUPANTS OTHER THAN MAINTENANCE PERSONNEL.
- 44" TO TOP OF DEVICE WHEN OBSTACLE (SHELVING, COUNTER, ETC.) IN FRONT OF DEVICE.

DEVICE MOUNTING HEIGHT

3714 NOT TO SCALE 2/13

THERMOSTAT, HUMIDISTAT SWITCH, OR OTHER DEVICE
NOTE 1,2

48"



Buford Goff
& Associates, Inc.
Engineers & Planners

Sheet Title:
HVAC DETAILS

Project:
**COUNTY OF LEXINGTON
ADMINISTRATION BUILDING ELEVATORS:
INSTALLATION AND RENOVATION**

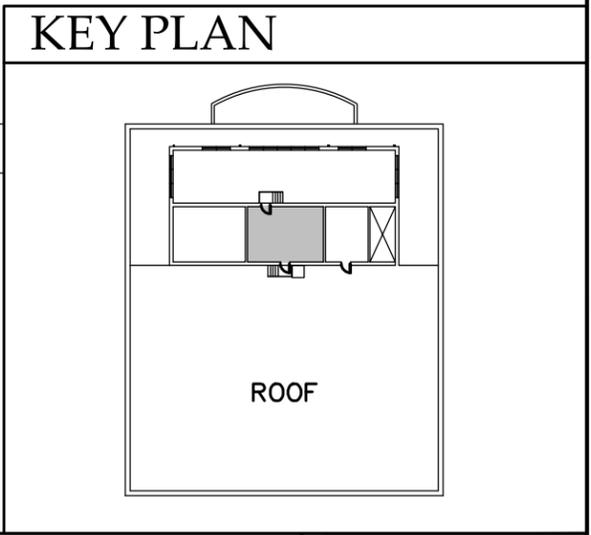
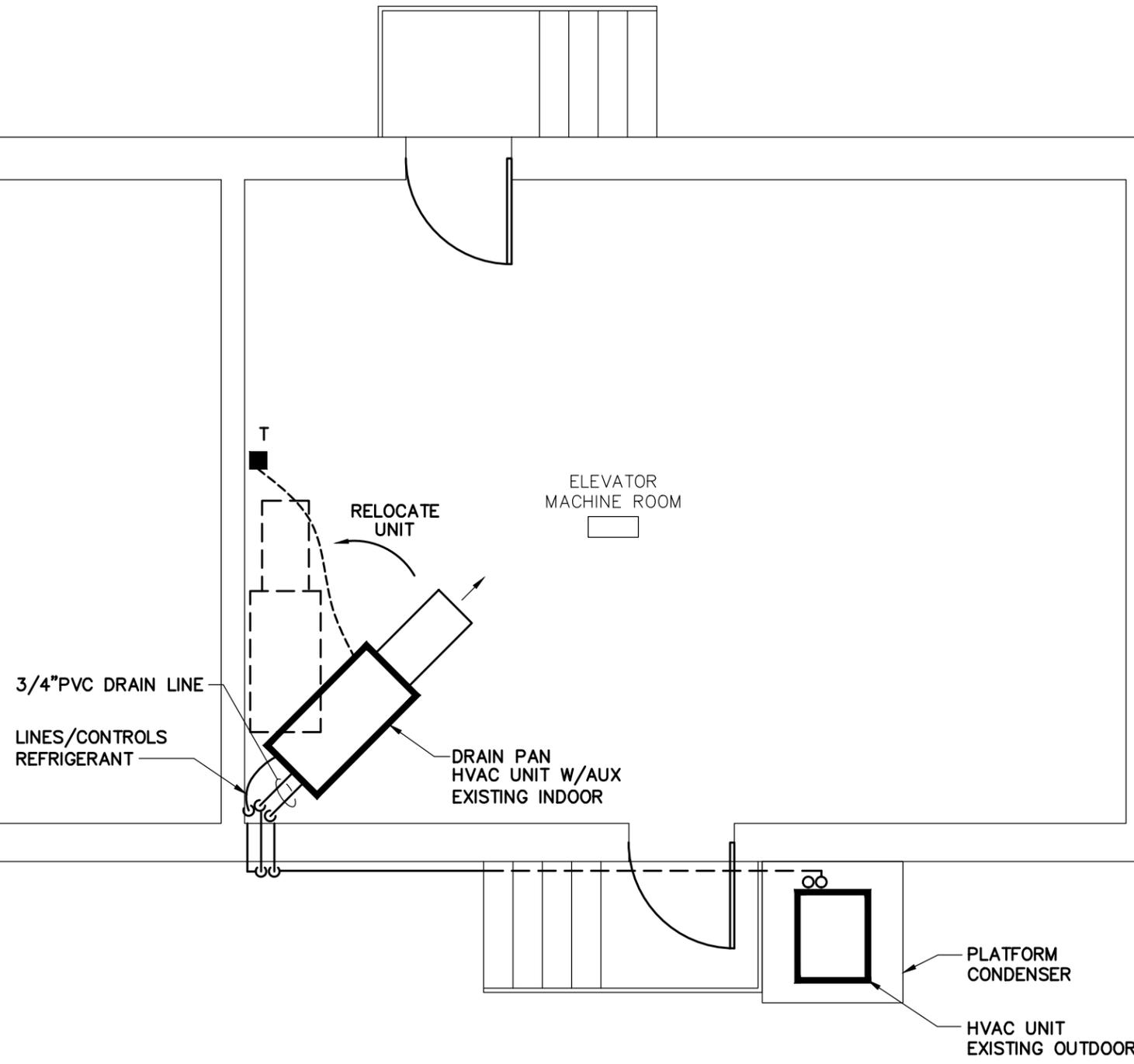
Sheet Number:
M0.2

BGA Comm. No: 14093
Date: 11/17/2014
Scale: 1/4"=1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014

NOTES:

1. IN THE BASE BID, PROVIDE ALL WORK NECESSARY TO RELOCATE THE EXISTING INDOOR UNIT ADJACENT TO WALL.
2. IF HVAC ALTERNATE IS ACCEPTED, THE EXISTING HVAC SYSTEM (INDOOR AND OUTDOOR UNIT), CONTROLS, SUPPORTS, DRAIN LINES, REFRIGERANT LINES AND ACCESSORIES SHALL BE REMOVED. PATCH AND REPAIR WALLS AND CEILING TO MATCH EXISTING. TOUCH UP PAINT TO MATCH EXISTING.



Sheet Title: **HVAC DEMOLITION PLAN**
 Project: **COUNTY OF LEXINGTON ADMINISTRATION BUILDING ELEVATORS: INSTALLATION AND RENOVATION**

Sheet Number: **M1.0**
 BGA Comm. No: 14093
 Date: 11/17/2014
 Scale: 1/4"=1'-0"

Revisions		
1	AMENDMENT 2	11/17/2014

