

INVITATION TO BID
from
COMMUNITY COLLEGE OF ALLEGHENY COUNTY
PURCHASING DEPARTMENT, 800 ALLEGHENY AVENUE, PITTSBURGH, PENNSYLVANIA 15233

BID PROPOSAL NO. 1138
EMERGENCY EGRESS LIGHTING MODIFICATIONS – BOYCE CAMPUS

Sealed proposals will be received and publicly opened by a Purchasing Agent of the Community College of Allegheny County.
**Proposals must be received by the Purchasing Department, 800 Allegheny Avenue,
Pittsburgh, Pennsylvania 15233
on or before 2:00 PM, on Tuesday, April 8, 2025.**

Proposals received after this deadline will be considered as a “late bid” and returned unopened to the offerer.

BID SCOPE

Provide all labor, material, equipment, permits and supervision required to perform emergency egress lighting modifications at Boyce Campus in accordance with specifications, drawings, terms and conditions contained herein.

A mandatory pre-bid meeting and site visitation will be held on Tuesday, March 25, 2025, at 10:00 a.m. Meet at the Boyce Campus Security Office, inside the front entrance, 595 Beatty Road, Monroeville, PA 15146.

Project Labor Agreement compliance is required.

For questions, contact Mike Cvetic (mcvetic@ccac.edu), Director of Purchasing no later than three business days before the bid due date.

BID REQUIREMENTS (where checked)

- Bid Bond. 10% of total base bid amount (Submit with Bid)
- Performance Bond. 100% of total contract amount (Awardee Only)
- Payment Bond. 100% of total contract amount (Awardee Only)
- Master Services Agreement (Awardee Only)
- No Lien Agreement (Awardee Only)
- Insurance Certificate (Awardee Only)

BID BOND: Bid must include the required bid bond or certified check, which will be returned to the unsuccessful bidder approximately 45 days after the bid due date.

PERFORMANCE BOND: The successful bidder will be required to enter into a written contract with the College and to furnish a contractor’s bond conditioned for the faithful and full performance of the contract with sufficient surety in the amount stated above. Any surety cosigning the contractor’s bond shall be an Incorporated surety company approved by the Court of Common Pleas of Allegheny County. Bond with surety must be furnished within 20 days after receipt of the contract. The Board of Trustees reserves the right to reject any bond furnished where it is in the best interest of the College to do so.

The College requires Power of Attorney attached to bonds to be dated concurrently, sealed, and executed by a proper **live** (not facsimile) **signature**.

PAYMENT BOND: The bidder to whom the contract is awarded shall furnish a bond to guarantee the payment of third-party subcontractors involved in fulfillment of services rendered against College contracts. Such bonds shall be with sufficient surety and in the amount stated above. Failure on the part of the contractor to furnish such bond shall be just cause for cancellation of award.

NO LIEN AGREEMENT AND/OR INSURANCE CERTIFICATES: As required by the College, the No Lien Agreement and/or Insurance Certificate may be requested of the successful bidder.

THE BOARD OF TRUSTEES RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

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FOR
BID PROPOSAL NO. 1138
EMERGENCY EGRESS LIGHTING MODIFICATIONS – BOYCE CAMPUS

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The CCAC Purchasing Department is now publishing all bids via the CCAC website at <https://www.ccac.edu/business/rfp-bids.php>. It will be each vendor's responsibility to monitor the bid activity within the given website ("Bid and RFP Opportunities") and ensure compliance with all applicable bid documents inclusive of any issued addenda. Failure to incorporate any applicable addenda in the final submittal may result in the rejection of your bid.

NOTE: FAX OR ELECTRONIC RESPONSES TO BID PROPOSALS ARE NOT ACCEPTABLE.

In the event a sealed bid is hand carried, it is the sole responsibility of the bidder to assure the bid is in possession of the CCAC Purchasing Department prior to the time set for opening.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

INSTRUCTIONS TO BIDDERS

1. All prices quoted shall be F.O.B. destination and include all freight and delivery charges to actual point of delivery.
2. **Bids that vary from specifications/addendum(s) may be rejected by the College.** Any and all changes to specifications will be issued by addenda via fax/mail. It is the responsibility of bidders to provide the College with company name, address, telephone, and fax numbers and contact names if applicable.
3. Bidders must be recognized dealers in specified materials and qualified to advise in the application and/or use of the materials. When requested, the bidder must satisfy the Community College of Allegheny County that they have the organization, capital, and stock availability and experience to fulfill their bid offer.
4. Bids may be rejected or award cancelled by the College if a bidder intends to sublet any/all of the required work.
5. Completely executed bid documents must be submitted in a **sealed envelope bearing the offering company's name and address; and, the bid number must appear on the sealed envelope.** No College representative will bear any responsibility for the premature opening of a bid which is not properly addressed and identified.
6. Whenever the words "Purchasing Agent" or a pronoun referring to a College Agent appears in either the specifications and/or Articles of Agreement, the Agent is acting only under the authority of and subject to the approval of the Board of Trustees of the Community College of Allegheny County.
7. The College reserves the right to award all or any items, separately or in a lump sum whichever is in the best interest of the College.
8. Bids for supplies shall be submitted to the College in accordance with the numbered item(s) on the price sheet. Unit prices(s) shall prevail where extension of prices is requested.
9. Contracts will not be awarded by the College to any corporation, firm, or individual that has failed in any former contract with the College to perform work or complete work or, in the College's sole judgment, to satisfactorily deliver or provide the quality of materials, fulfill a guarantee(s) or complete work in accordance with the schedule for such prior contract."
10. If the College Agent is of the opinion that the awarded work/products are unnecessarily delayed, the rate of progress of delivery is unsatisfactory, or that the corporation, firm, or individual contractor is willfully violating any of the contract requirements or conditions or is acting in bad faith, the College's Agent shall take whatever action necessary for the completion of the work and/or delivery of the products to the College. Resulting expenses to the College will be deducted from monies due the contractor and the bondsman will be held liable for any balance due at the completion of the contract.
11. Inspection of materials and workmanship of the contractor by a College Agent will not lessen the responsibility of the contractor from the obligation to perform and deliver satisfactory work/materials to the College. The contractor is expected to pay for the cost of tests for defective materials. This cost may be deducted from any monies due the contractor from the College.
12. The contractor will not receive instructions from a College Agent relative to the work or delivery until a contract has been duly signed and the bond, if required, is approved.
13. Companies may quote price(s) on work/material to any and all bidders and may also directly submit a bid to the College for the work/material.
14. When samples are requested by the College, the bidder must supply them free of charge. Samples will not be returned to the bidder.

15. The bidder is solely at risk when using unauthorized patented material.
16. Quantities requested by the College are for bidding purposes only. The College may purchase more or less than the estimated quantities.
17. The College reserves the right to reject any and all bids, and to waive minor discrepancies in the bids or specifications, when in the best interest of the College. The College may purchase any part, all, or none of the materials specified.
18. The College will reject materials that do not meet specifications, even if the bidder lists trade names, or names of such materials on the bid.
19. All prices quoted must be held firm for the contract period. Bids containing escalation or other clauses for price change may be rejected. Discounts or other uncalled for allowances quoted will not be considered in making the award and the bid may be rejected.
20. Unless otherwise specified, materials, supplies, and/or equipment must be delivered thirty (30) days from the date of the purchase order.
21. Unless otherwise specified, materials, supplies, and/or equipment must be new, current stock, and unused.

SIGNING OF AGREEMENT AND BOND

22. Successful bidders are required to sign Contract Articles of Agreement and bond forms as follows:

If trading as an Individual: All copies of Contract Articles of Agreement and bond(s) must be signed by the individual to whom the award is made and signature must be witnessed by the same witness.

If trading as a Partnership: All copies of Contract Articles of Agreement and bond(s) must be signed by **every partner** comprising the Partnership, regardless of number, and these signatures must be witnessed by the same witness.

If trading as a Corporation: All copies of Contract Articles of Agreement and bond(s) must be signed by the **President (or Vice President)** and attested by the Secretary or Assistant Secretary and Corporate seal must appear on all copies.

The County requires that Power of Attorney forms be attached to bonds, bear the same date as that appearing on the bonds and that the forms are sealed and executed by a proper **live signature**.

FICTITIOUS NAME REGISTRATION

23. To comply with a provision of the law regarding registration under the Fictitious Name Act of the Commonwealth of Pennsylvania, successful bidders trading as an **Individual or a Partnership** must submit a certified copy of their Fictitious Name Registration with their contract. Fictitious Name Registration forms are issued by the Office of the Prothonotary of Allegheny County, or the county in which the business is located.

PREVENTION OF DELAY

24. A contractor will be considered in **default** if the contractor has work performed or means employed in the carrying out of the contract that would in any way cause or result in a suspension or delay of, or strike upon the work to be performed of any of the trades working in or about the premises described, or in or about any other building of the Community College of Allegheny County.
25. When trade names or catalog numbers are used, bidders may quote on any equal (unless otherwise stated by the College) but such bids must show trade names and/or catalog numbers of the products.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

RETURN BID PROPOSAL FORM

FOR

BID PROPOSAL NO. 1138

EMERGENCY EGRESS LIGHTING MODIFICATIONS – BOYCE CAMPUS

Complete this form and submit with your bid.

- **The undersigned agrees to comply with the Instructions to Bidders and Specifications for the price(s) quoted on the Return Price Form. Price(s) quoted include all allowable cash and/or credit discounts.**
- **The College may reject bids quoting unspecified discounts and/or allowances.**

Submitted by:

Company Name Bidding
(Please print)

Contact Person at Company
(Please print)

Signature
(Handwritten signature must appear here in ink.)

Title

Address

Telephone Number (Include Area Code.)

Fax Number (Include Area Code.)

Trading as: (Check one.) Please print.

_____ Individual Owner _____

_____ Partnership Partner _____ Partner _____

_____ Corporation Exact Name _____

State Incorporated _____

THE BOARD OF TRUSTEES OF THE COLLEGE RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS.

**BID PROPOSAL NO. 1138
EMERGENCY EGRESS LIGHTING MODIFICATIONS – BOYCE CAMPUS**

BID SHEET

BASE BID

Provide all labor, material equipment, permits, and supervision required furnish and install emergency egress lighting at Boyce Campus as specified herein.

Lump Sum Bid: \$ _____

BIDDER'S NAME (please print): _____

RETURN FORM 2.0

Contractor shall complete unit price schedule - prices include installation; programming; installed and tested, and all required accessories for lighting system.

UNIT PRICE SHEET (add or deduct)

| Component | Unit Price | Notes |
|------------------------|-------------------|--------------|
| RF1 | \$ _____ | |
| RF2 | \$ _____ | |
| P1 | \$ _____ | |
| DL1 | \$ _____ | |
| DL2 | \$ _____ | |
| DL3 | \$ _____ | |
| DL4 | \$ _____ | |
| DL5 | \$ _____ | |
| DL6 | \$ _____ | |
| DL7 | \$ _____ | |
| SF1 | \$ _____ | |
| SF2 | \$ _____ | |
| SF3 | \$ _____ | |
| SF4 | \$ _____ | |
| SL1 | \$ _____ | |
| WL1 | \$ _____ | |
| WP1 | \$ _____ | |
| EX1 | \$ _____ | |
| EX2 | \$ _____ | |
| BP1 | \$ _____ | |
| VG1 | \$ _____ | |
| WIRELESS SWITCH | \$ _____ | |

Bidder's Name: _____

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

NON-COLLUSION AFFIDAVIT

Contract/Bid No. 1138

State of _____ : :s.s.

County of _____ :

I state that I am _____ of _____
(title) (name of my firm)

and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

- (1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any bidder or potential bidder.
- (2) Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.
- (3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.
- (4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.
- (5) _____, its affiliates,
(name of my firm)

subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that _____ understands and
(name of my firm)

acknowledges that the above representations are material and important, and will be relied on by the Community College of Allegheny County in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the Community College of Allegheny County of the true facts relating to the submission of bids for this contract.

Signature _____ Title _____

(MUST BE SIGNED HERE IN HANDWRITING, IN INK.)

Sworn to and subscribed before me this _____ day of _____, 20_____

Notary Public _____ My Commission Expires: _____

INSTRUCTIONS FOR NON-COLLUSION AFFIDAVIT

1. This Non-collusion Affidavit is material to any contract awarded pursuant to this bid. According to the Pennsylvania Antibid-Rigging Act, 73 P.S. § 1611 et seq., governmental agencies may require Non-collusion Affidavits to be submitted together with bids.
2. This Non-collusion Affidavit must be executed by the member, officer or employee of the bidder who makes the final decision on prices and the amount quoted in the bid.
3. Bid rigging and other efforts to restrain competition and the making of false sworn statements in connection with the submission of bids are unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the bidder with responsibilities for the preparation, approval or submission of the bid.
4. In the case of a bid submitted by a joint venture, each party to the venture must be identified in the bid documents, and an Affidavit must be submitted separately on behalf of each party.
5. The term “complementary bid” as used in the Affidavit has the meaning commonly associated with that term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally high or noncompetitive bid, and any other form of bid submitted for the purpose of giving a false appearance of competition.
6. Failure to file an Affidavit in compliance with these instructions will result in disqualification of the bid.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

MBE/WBE PARTICIPATION: CCAC encourages the participation of minority and women-owned businesses in all of its contracts and is committed to providing maximum opportunities for qualified minority and/or women-owned business enterprises ("MBE/WBEs") to participate in its work. Bidder agrees (1) if qualified, to take reasonable and timely steps to obtain appropriate certification as an MBE and/or WBE, (2) to ensure that MBE and/or WBEs are appropriately considered as subcontractors and/or suppliers under this Agreement; and (3) to report moneys spent for MBE and/or WBE subcontractors and/or suppliers for work as CCAC may from time to time reasonably request. **CCAC's goal for MBE/WBE participation is 20% (13% MBE and 7% WBE/DBE).** Please provide documentation as to your firm's good faith effort to reach this goal by describing all applicable details of MBE/WBE participation that may be included in the resulting agreement.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

MINORITY PARTICIPATION GOALS – BID PROPOSAL NO. 1138

The following must be included with your bid.

Reference: General Conditions for Construction and Renovation Contracts - Item 6, Page 2 – Minority & Disadvantaged Participation Goals

A 20% M/W/DBE work participation is established (13% MBE and 7% WBE/DBE). Document your firm’s good faith effort to obtain the 20% Goal:

| M/W/DBE Company | Contact Person | Phone Number | \$Amount or Objective % |
|-----------------|----------------|--------------|-------------------------|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

_____ I am an M/W/DBE. (ATTACH CERTIFICATION)

Total: _____

Bidder acknowledges that CCAC may communicate with listed firms to verify the extent of the contact.

Bidding Company’s Name: _____

Signature: _____

Title: _____

Date: _____

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

BID PROPOSAL NO. 1138

**COMMONWEALTH OF PENNSYLVANIA
BID AWARD & RETENTION LAW
ACT NO. 1978-317, SENATE BILL 68, NOVEMBER 26, 1978**

EXTENSION OF CONTRACT EXECUTION REQUIREMENTS

In the event the contract(s)/purchase order(s) resulting from the above specified bid proposal is/are in excess of \$50,000.00, the above specified Act will apply.

This Act requires the awarding of a contract to the lowest responsible bidder within sixty (60) days of the date of bid opening and the execution of a contract within thirty (30) days after award by the College Board of Trustees. Thirty (30) day extensions of the date for award and for execution are permitted by the mutual written consent of the College and the successful bidder.

Due to the extent of the approval actions required prior to award and execution of any contract, it may not be possible for the College to complete contract award and execution within the sixty (60) day and thirty (30) day periods. Accordingly, each bidder is requested to indicate their agreement with a thirty (30) day extension of the sixty (60) day award date and thirty (30) day execution date by signing this form and returning it with their bid.

Name of Company

Authorized Company Representative

Signature

Title

MUST BE SIGNED HERE IN HANDWRITING, IN INK

RETURN FORM 5.0

LETTER OF ASSENT

BID PROPOSAL NO. 1138

This is to certify that the undersigned Contractor, _____, has examined a copy of the Project Labor Agreement between the Community College of Allegheny County and the Pittsburgh Regional Building & Construction Trades Council, AFL-CIO dated February 15, 2011 and hereby agrees to comply with all terms and execution of this Agreement. It is understood that the execution of this Letter of Assent shall be as binding on the Contractor as though the Contractor had signed the aforementioned Agreement.

This Letter of Assent will remain in effect through completion of Contractor's work on the above-captioned project at the Community College of Allegheny County's Allegheny Campus location.

The undersigned Contractor further agrees that upon notification by the College, the Contractor will furnish documented proof to the College that the employer complies with the terms and conditions of the Agreement.

This Letter of Assent shall become effective and binding upon the Contractor this _____ day of _____, 20____ and shall remain in effect as set forth above.

Name (Please print)

Signature

(MUST BE SIGNED HERE IN HANDWRITING, IN BLUE INK.)

Title

Name of Contractor

RETURN FORM 6.0

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

GENERAL CONDITIONS

FOR

CONSTRUCTION AND RENOVATION CONTRACTS

1. PERMITS

It is the responsibility of the contractor to obtain all permits and/or licenses required by Federal, State, County, City, or other local Municipalities or Authorities for work done or services performed under this contract.

2. ROLE OF CONTRACTOR

In the performance of the work hereunder, the contractor shall act as an independent contractor, and all of his agents, employees, and subcontractors shall be subject solely to the control, supervision, and authority of the contractor.

3. EMPLOYEES OF THE CONTRACTOR

It is understood that the contractor in signing the contract will employ only competent and first-class workmen and mechanics; that no workmen shall be regarded as competent and first-class except those who are duly skilled in their respective branches of labor.

4. BONDS

The College will accept only bonds written by surety companies authorized to do business in the Commonwealth of Pennsylvania and the County of Allegheny and included on the United States Treasury Department Annual List of Surety Companies published July first of each year. Limits for those companies appearing on the United States Treasury Department's list cannot be exceeded. This list is available for inspection in the Purchasing Department, Community College of Allegheny County, Administration Building, 800 Allegheny Avenue, Pittsburgh, Pennsylvania 15233. It is also available from the Surety Bond Branch, Financial Management Services, Department of the Treasury, Washington, D.C. 20226. Phone: 1.202.634.2214.

5. EQUAL OPPORTUNITY

Contractor and all subcontractors shall not discriminate against any employee or applicant for employment because of race, color, creed, national origin, or sex. Contractor and all subcontractors shall also comply with all applicable Federal, State, and local Fair Employment Practice Acts, or similar Acts, Rules, and Regulations and whether or not applicable will comply with the Federal Civil Rights Act of 1964. The Terms and Provisions of Executive Order 11246 and any Executive Order modifying or superseding same, are incorporated herein with respect to any work subject thereto.

The contractor and all subcontractors shall, in all solicitations or advertisements for employees placed by them or their behalf state all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, or national origin.

6. MINORITY & DISADVANTAGED PARTICIPATION GOALS

The College's goal is to obtain 20% MBE/WBE/DBE (13% Minority-owned Business enterprise/7% Woman-owned Business Enterprise/Disadvantaged Business Enterprise) participation in the work. This is to be based on the dollar value of employment, subcontracts, supplies, goods, and services as a percentage of the total contract amount. The bidder/contractor must demonstrate to the College prior to award of the contract, and periodically thereafter throughout the term of the contract, their compliance and continued ability to comply with these goals.

The contractor shall submit with their bid (on Return Form 4.0) a completed Minority & Disadvantaged Contractor Commitment Plan that will contain the details of how they plan to comply with this goal should they be awarded the contract.

If the plan is not submitted in the bid or is not acceptable, the College may deem the bid non-responsive and may award the work to the next lowest responsive bidder with an acceptable plan. Thus, it behooves all bidders to formulate their M/W/DBE plan before submitting a bid.

Finding Certified M/W/DBE's - All subcontractors and suppliers of goods and services used to comply with this goal must be **certified** minority or disadvantaged firms. They may be certified by any recognized and reputable organization such as the following: African American Chamber of Commerce, Allegheny County, Port Authority of Allegheny County, City of Pittsburgh, Pittsburgh Regional Minority Purchasing Council, Commonwealth of Pennsylvania, United States Federal Government.

If the firm is not certified and desires to be certified, it is suggested that they contact one of the following organizations. These organizations may also be used as references for sourcing M/W/DBE firms.

Allegheny County
M/W/DBE Department
County Office Building Rm 204
542 Forbes Avenue
Pittsburgh, Pennsylvania 15219
412.350.4309

EMSDC
Regional Enterprise Tower
425 Sixth Avenue
Suite 401
Pittsburgh, Pennsylvania 15219
412.391.4423

Diversity Business Resource Center
700 River Avenue Suite 231
Pittsburgh, PA 15212
412.322.3272

African American Chamber of Commerce
Koppers Building
436 Seventh Avenue, Suite 2220
Pittsburgh, PA 15219
412.391.0610

A list of PA certified M/W/DBE firms can be found on the Internet at <http://www.paucp.com>.

The College expects all firms to demonstrate a good faith effort to include M/W/DBE's when bidding on College contracts. A good faith effort as defined by the Code of Federal Regulations (49CFR26) means "*efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement*".

If you are not successful in securing M/W/DBE participation after a good faith effort is made, provide the following in your waiver request:

- A detailed account of your efforts;
- Your normal business practice and/or inventory profile; and
- An active diversity plan/policy

Reporting During and After Project Completion - The contractor shall submit with their monthly application for payment a written M/W/DBE Contractor Report demonstrating their compliance with the goal. The report shall state the dollar amount spent on labor, materials, services, and subcontracts and shall list firm names and vendor names. At the completion of the project, with final application for payment, the contractor shall submit a recap of their compliance which shall state the dollar amount spent on labor, materials, subcontracts, and services as a percentage of the total contract amount. Projects with shorter timeframes shall require a one-time only report at the completion of the project. Reports are to be accompanied by back-up documentation evidencing the business relationship with the M/W/DBE for the particular project (e.g.: copies of invoices, purchase orders, or evidence of payments).

Failure to Comply With M/W/DBE Goals – If the contractor fails to make a good faith effort (as determined by the College) to comply with the College's 20% M/W/DBE goal or fails to meet their M/W/DBE commitment or to submit documentation as required by the College, the College may consider such non-compliance or breach of contract and any one or more of the following may occur:

- Rejection of the bid
- Forfeiture of bid guaranty
- Termination of the contract
- The imposing of sanctions as deemed appropriate by the College
- Contractor being barred from bidding on College contracts for up to three (3) years
- Or such other remedy as the College deems appropriate

7. FINANCIAL INTEREST

All bidders for construction must be established firms competent to perform the required scope of work. All bidders must satisfy the Community College of Allegheny County that they have the requisite organization, capital, plant, stock, ability, and experience to satisfactorily execute and contract in accordance with the provisions of the contract in which they are interested.

If the contractor's base bid is \$25,000.00 or more, the American Institute of Architects form, "Contractors Qualification Statement" form A305 - 1986 (or latest revision) may be requested by CCAC. This form is available from the American Institute of Architects, 1735 New York Avenue N.W., Washington, D.C. 20006. If requested by CCAC, a completed form A305 is to be submitted within 48 business hours and may be faxed to 412.237.3195.

8. EMPLOYMENT OF INDEPENDENT SUBCONTRACTORS

If you are a contractor to the College and the value of the base contract is \$25,000.00 or more, you must secure approval of all proposed subcontractors from the College prior to beginning work. Information on your proposed subcontractors is to be submitted on the form entitled Proposed Subcontractors.

Each proposed subcontractor to be employed must be an independent contractor "in fact" and must meet the following criteria:

- a. The subcontractor must have a Federal identification number.
- b. The subcontractor must perform these same services for others.
- c. The subcontractor must have an established place of business.
- d. The subcontractor must use their own tools and equipment.
- e. The subcontractor must pay all taxes and other items required by law to be paid by an employer with respect to compensation paid to their employees.
- f. The subcontractor must provide and maintain all insurance required by law and the College.

If the proposed subcontractor does not meet all of these criteria, they will not be approved.

9. VERBAL AUTHORIZATIONS

No verbal agreement or understanding with any officer, agent, or employee of the College either before or after the execution of the contract shall alter, amend, modify, or rescind any of the terms or provisions contained in any of the contract documents. This provision shall not limit or affect the right to make changes or variations in the work. Any changes must be authorized in writing.

10. APPLICABLE LAW, ACTS, AND ORDINANCES

The contractor(s) shall agree to abide by and be bound by all applicable provisions and regulations of all laws, acts, and ordinances relating to and regulating the hours and conditions of employment.

11. PENNSYLVANIA PREVAILING WAGE ACT

The Pennsylvania Prevailing Wage Act shall be incorporated into and made part of all College construction related contract(s) having an estimated value of \$25,000.00 or more.

It is the responsibility of the contractor to ensure that they have included the appropriate Pennsylvania prevailing wage rates in their proposal to the College. Failure to do this will not be a reason for the contractor to withdraw their bid or fail to perform the contract or to request additional payments from the College.

In accordance with the Prevailing Wage Determination Act, the contractor(s) shall:

- a. Pay no less than the wage rates including contributions for employee benefits as determined in the decision of the Secretary of Labor and Industry and shall comply with the conditions of the Pennsylvania Prevailing Wage Act approved August 15, 1961 (Act No. 442) as amended August 9, 1963 and/or subsequent amendments thereof (Act No. 342) and the regulations issued pursuant thereto.
- b. Apply all applicable provisions of the Acts and Laws to all work performed on the contract by the contractor(s) and subcontractor(s).
- c. Insert in each of his subcontracts all of the stipulations contained in these required provisions and such other stipulations as may be required.
- d. Assure that no workmen be employed on the public work except in accordance with the classifications set forth in the decisions of the Secretary. In the event that additional or different classifications are necessary, the procedure set forth in Section 7 of the above referenced Regulations shall be followed.
- e. Assure that all workmen employed or working on this contract shall be paid unconditionally regardless of whether any contractual relationship exists or the nature of any contractual relationship which may be alleged to exist between any contractor, subcontractor, and workmen not less than once a week without deduction or debate on any account either directly or indirectly except authorized deductions, the full amounts due at the time of payment computed at the rates applicable to the time worked on the appropriate classification. Nothing in this contract, the Act or these Regulations, prohibits the payment of more than the general prevailing minimum wage rates as determined by the Secretary to any workmen on public work.
- f. Each subcontractor shall post for the entire period of construction the wage determination decisions of the Secretary including the effective date of any charges thereof in a prominent and easily accessible place or places at the site of the work and at such place or places used by them to pay workmen their wages. The posted notice of wage rates must contain the following information:
 1. Name of project.
 2. Name of public body for which it is being constructed.
 3. The crafts and classifications of workmen listed in the Secretary's general prevailing minimum wage rate determination for the particular project.

4. The general prevailing minimum wage rates determined for each craft and classification and the effective date of any changes.
 5. A statement advising workmen that if they have been paid less than the general prevailing minimum wage rate for their job classification or that the contractor and/or subcontractor are not complying with the Act or these Regulations in any manner whatsoever they may file a protest with the Secretary of Labor and Industry. Any Workmen paid less than the rate specified in the contract shall have a civil right of action for the difference between the wage paid and the wages stipulated in the contract, which right of action must be exercised within six months from the occurrence of the event creating such right.
- g. All subcontractors shall keep an accurate record showing the name, craft, and/or classification, number of hours worked per day, and the actual hourly rate of wage paid (including employee benefits) to each workman employed by him in connection with the public work and such record must include any deductions from each workman. The record shall be preserved for two years from the date of payment and shall be open at all reasonable hours to the inspection of the public body awarding the contract and to the Secretary or his duly authorized representative.
 - h. Assure that apprentices shall be limited to such numbers as shall be in accordance with a bonafide apprenticeship program registered with and approved by the Pennsylvania Apprenticeship and Training Council and only apprentices whose training and employment are in full compliance with the provisions of the Apprenticeship and Training Act approved July 14, 1961 (Act No. 304) and the Rules and Regulations issued pursuant thereto shall be employed on the public work project. Any workman using the tools of a craft who does not qualify as an apprentice within the provisions of this subsection shall be paid at the rate predetermined for journeymen in that particular craft and/or classification.
 - i. Pay wages without any deductions except authorized deductions. Employers not parties to a contract requiring contributions for employee benefits which the Secretary has determined to be included in the general prevailing minimum wage rate shall pay the monetary equivalent thereof directly to the workmen.
 - j. Be advised that payment of compensation to workmen for work performed on public work on a lump sum basis, or a piece work system, or a price certain for the completion of a certain amount of work, or the production of a certain result shall be deemed a violation of the Act and these Regulations regardless of the average hourly earnings resulting therefrom.
 - k. Each subcontractor shall file a statement each week and a final statement at the conclusion of the work on the contract with the contracting agency under oath and in form satisfactory to the Secretary certifying that all workmen have been paid wages in strict conformity with the provisions of the contract as prescribed by Section 3 of these Regulations; or, if any wages remain unpaid, to set forth the amount of wages due and owing to each workman respectively. The College shall require the contractor and all subcontractors to file weekly wage certifications utilizing form WH-347. (Reference: Section 10(a) of Act and Section 10 of Regulations). Prior to making final payment the College will require final wage certifications from all contractors and subcontractors.

12. PAYMENT TO CONTRACTORS

The College maintains the right to withhold a percentage of monies requested by contractors for work done under this contract in accordance with the American Institute of Architects Application for Payment form G-702 as indicated in Section 01152--Applications for Payment of the technical specifications.

13. INSURANCE REQUIREMENT

A properly executed certificate of insurance must be submitted with the signed Contract Articles of Agreement. The certificate of insurance must show that the contractor and subcontractors comply with the College's insurance requirements. The certificate of insurance must state that in the event any coverage shown is to be cancelled the College will be given a thirty day advance notice of the cancellation.

14. MINORITY BIDDERS

The Community College of Allegheny County hereby notifies all bidders that it will affirmatively ensure that minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

15. MODIFICATION AND WITHDRAWAL OF BIDS

- a. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- b. Bidders may withdraw their bid within two (2) business days of the bid opening only within accordance of Commonwealth of Pennsylvania public bidding law.

16. TAXES

CCAC is a governmental entity and is generally exempt from sales and use tax with respect to purchases of building machinery and equipment. A tax exemption certificate will be provided upon request. It is the bidder's responsibility to pay any/all applicable taxes on non-exempt equipment, supplies and services in accordance with applicable law.

17. PENNSYLVANIA STEEL PRODUCTS PROCUREMENT ACT

Contractor acknowledges that CCAC is a public agency subject to the requirements of the Pennsylvania Steel Products Procurement Act, 73 P.S. Section 1881 et. seq (the "SPPA"). Contractor therefore represents and warrants that any and all steel products purchased, used or supplied by it in the performance of the Contract will be melted and manufactured in the United States, and that its performance hereunder will otherwise comply with requirements of the SPPA at all times. Contractor further agrees to provide CCAC with documentation and/or certification of its compliance with the foregoing requirements, as required under the SPPA, and acknowledges that it shall not be entitled to receive payment hereunder until such documentation and/or certification has been provided.

18. MARKUPS ON CHANGE ORDERS

Markups on change order requests shall not exceed 15%. This would apply to overhead and profit, labor, materials, equipment, etc.

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| | |
|----------------------------|--|
| Project Name: | Emergecny Egress Lighting Modifications - Boyce Campus |
| General Description: | Electrical construction for modifications to emergency egress lighting |
| Project Locality | Monroeville, PA |
| Awarding Agency: | Community College of Allegheny County |
| Contract Award Date: | 4/15/2025 |
| Serial Number: | 25-02616 |
| Project Classification: | Building |
| Determination Date: | 3/11/2025 |
| Assigned Field Office: | Pittsburgh |
| Field Office Phone Number: | (412)565-5300 |
| Toll Free Phone Number: | (877)504-8354 |
| Project County: | Allegheny County |

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| Project: 25-02616 - Building | Effective Date | Expiration Date | Hourly Rate | Fringe Benefits | Total |
|--|-----------------------|------------------------|--------------------|------------------------|--------------|
| Asbestos & Insulation Workers | 8/1/2023 | | \$42.40 | \$29.01 | \$71.41 |
| Asbestos & Insulation Workers | 8/1/2024 | | \$43.40 | \$29.51 | \$72.91 |
| Boilermakers | 6/1/2016 | | \$40.90 | \$27.61 | \$68.51 |
| Bricklayer | 6/1/2024 | | \$40.25 | \$25.34 | \$65.59 |
| Bricklayer | 12/1/2024 | | \$41.00 | \$25.59 | \$66.59 |
| Carpenters - Piledriver/Welder | 1/1/2023 | | \$40.63 | \$21.22 | \$61.85 |
| Carpenters - Piledriver/Welder | 1/1/2024 | | \$42.13 | \$21.97 | \$64.10 |
| Carpenters - Piledriver/Welder | 1/1/2025 | | \$43.38 | \$22.72 | \$66.10 |
| Carpenters - Piledriver/Welder | 1/1/2026 | | \$44.63 | \$23.47 | \$68.10 |
| Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers | 6/1/2023 | | \$39.69 | \$19.93 | \$59.62 |
| Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers | 6/1/2024 | | \$41.49 | \$19.93 | \$61.42 |
| Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers | 6/1/2025 | | \$43.34 | \$19.93 | \$63.27 |
| Cement Masons | 6/1/2023 | | \$33.07 | \$23.59 | \$56.66 |
| Cement Masons | 7/1/2024 | | \$34.57 | \$25.09 | \$59.66 |
| Drywall Finisher | 6/1/2023 | | \$32.39 | \$23.75 | \$56.14 |
| Drywall Finisher | 6/1/2024 | | \$34.01 | \$24.88 | \$58.89 |
| Electricians & Telecommunications Installation Technician | 12/22/2023 | | \$48.61 | \$31.80 | \$80.41 |
| Electricians & Telecommunications Installation Technician | 12/27/2024 | | \$50.86 | \$32.69 | \$83.55 |
| Electricians & Telecommunications Installation Technician | 12/26/2025 | | \$54.16 | \$32.69 | \$86.85 |
| Elevator Constructor | 1/1/2023 | | \$56.14 | \$42.83 | \$98.97 |
| Elevator Constructor | 1/1/2024 | | \$58.55 | \$43.87 | \$102.42 |
| Elevator Constructor | 1/1/2025 | | \$61.07 | \$40.05 | \$101.12 |
| Glazier | 9/1/2023 | | \$35.65 | \$30.05 | \$65.70 |
| Iron Workers | 6/1/2023 | | \$38.89 | \$35.02 | \$73.91 |
| Iron Workers | 6/1/2024 | | \$39.89 | \$36.47 | \$76.36 |
| Laborers (Class 01 - See notes) | 1/1/2023 | | \$25.82 | \$19.46 | \$45.28 |
| Laborers (Class 01 - See notes) | 1/1/2024 | | \$26.82 | \$19.46 | \$46.28 |
| Laborers (Class 01 - See notes) | 1/1/2025 | | \$27.32 | \$19.96 | \$47.28 |
| Laborers (Class 01 - See notes) | 1/1/2026 | | \$27.82 | \$20.46 | \$48.28 |
| Laborers (Class 02 - See notes) | 1/1/2023 | | \$25.97 | \$19.46 | \$45.43 |
| Laborers (Class 02 - See notes) | 1/1/2024 | | \$26.97 | \$19.46 | \$46.43 |
| Laborers (Class 02 - See notes) | 1/1/2025 | | \$27.47 | \$19.96 | \$47.43 |
| Laborers (Class 02 - See notes) | 1/1/2026 | | \$27.97 | \$20.46 | \$48.43 |
| Laborers (Class 03 - See notes) | 1/1/2023 | | \$28.97 | \$19.46 | \$48.43 |
| Laborers (Class 03 - See notes) | 1/1/2024 | | \$29.97 | \$19.46 | \$49.43 |
| Laborers (Class 03 - See notes) | 1/1/2025 | | \$30.47 | \$19.96 | \$50.43 |
| Laborers (Class 03 - See notes) | 1/1/2026 | | \$30.97 | \$20.46 | \$51.43 |
| Laborers (Class 04 - See notes) | 1/1/2021 | | \$23.57 | \$19.32 | \$42.89 |
| Landscape Laborer (Skilled) | 1/1/2024 | | \$24.79 | \$18.53 | \$43.32 |
| Landscape Laborer (Skilled) | 1/1/2025 | | \$25.79 | \$18.78 | \$44.57 |

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| Project: 25-02616 - Building | Effective Date | Expiration Date | Hourly Rate | Fringe Benefits | Total |
|--------------------------------------|-----------------------|------------------------|--------------------|------------------------|--------------|
| Landscape Laborer (Skilled) | 1/1/2026 | | \$26.79 | \$19.03 | \$45.82 |
| Landscape Laborer (Tractor Operator) | 1/1/2024 | | \$25.09 | \$18.53 | \$43.62 |
| Landscape Laborer (Tractor Operator) | 1/1/2025 | | \$26.09 | \$18.78 | \$44.87 |
| Landscape Laborer (Tractor Operator) | 1/1/2026 | | \$27.09 | \$19.03 | \$46.12 |
| Landscape Laborer | 1/1/2024 | | \$24.37 | \$18.53 | \$42.90 |
| Landscape Laborer | 1/1/2025 | | \$25.37 | \$18.78 | \$44.15 |
| Landscape Laborer | 1/1/2026 | | \$26.37 | \$19.03 | \$45.40 |
| Millwright | 6/1/2020 | | \$41.68 | \$20.32 | \$62.00 |
| Operators (Class 01 - see notes) | 6/1/2022 | | \$38.89 | \$23.69 | \$62.58 |
| Operators (Class 01 - see notes) | 6/1/2023 | | \$40.69 | \$23.89 | \$64.58 |
| Operators (Class 01 - see notes) | 6/1/2024 | | \$41.69 | \$24.39 | \$66.08 |
| Operators (Class 01 - see notes) | 6/1/2025 | | \$42.72 | \$24.79 | \$67.51 |
| Operators (Class 01 - see notes) | 6/1/2026 | | \$43.74 | \$25.29 | \$69.03 |
| Operators (Class 02 -see notes) | 6/1/2022 | | \$32.82 | \$23.69 | \$56.51 |
| Operators (Class 02 -see notes) | 6/1/2023 | | \$34.62 | \$23.89 | \$58.51 |
| Operators (Class 02 -see notes) | 6/1/2024 | | \$35.62 | \$24.39 | \$60.01 |
| Operators (Class 02 -see notes) | 6/1/2025 | | \$36.67 | \$24.79 | \$61.46 |
| Operators (Class 02 -see notes) | 6/1/2026 | | \$37.67 | \$25.29 | \$62.96 |
| Operators (Class 03 - See notes) | 6/1/2022 | | \$30.03 | \$23.69 | \$53.72 |
| Operators (Class 03 - See notes) | 6/1/2023 | | \$31.83 | \$23.89 | \$55.72 |
| Operators (Class 03 - See notes) | 6/1/2024 | | \$32.83 | \$24.39 | \$57.22 |
| Operators (Class 03 - See notes) | 6/1/2025 | | \$33.88 | \$24.79 | \$58.67 |
| Operators (Class 03 - See notes) | 6/1/2026 | | \$34.88 | \$25.29 | \$60.17 |
| Painters Class 6 (see notes) | 6/1/2023 | | \$30.56 | \$24.01 | \$54.57 |
| Painters Class 6 (see notes) | 6/1/2024 | | \$32.14 | \$24.93 | \$57.07 |
| Painters Class 6 (see notes) | 6/1/2025 | | \$34.16 | \$25.81 | \$59.97 |
| Piledrivers | 1/1/2023 | | \$39.13 | \$21.22 | \$60.35 |
| Piledrivers | 1/1/2024 | | \$40.63 | \$21.97 | \$62.60 |
| Piledrivers | 1/1/2025 | | \$41.88 | \$22.72 | \$64.60 |
| Piledrivers | 1/1/2026 | | \$43.13 | \$23.47 | \$66.60 |
| Plasterers | 6/1/2023 | | \$32.14 | \$20.54 | \$52.68 |
| Plasterers | 6/1/2024 | | \$33.14 | \$21.04 | \$54.18 |
| plumber | 6/1/2023 | | \$48.65 | \$25.87 | \$74.52 |
| plumber | 6/1/2024 | | \$51.75 | \$25.87 | \$77.62 |
| plumber | 6/1/2025 | | \$54.95 | \$25.87 | \$80.82 |
| plumber | 6/1/2026 | | \$58.05 | \$25.87 | \$83.92 |
| plumber | 6/1/2027 | | \$61.15 | \$25.87 | \$87.02 |
| Pointers, Caulkers, Cleaners | 12/1/2022 | | \$35.47 | \$20.88 | \$56.35 |
| Pointers, Caulkers, Cleaners | 6/1/2024 | | \$38.59 | \$21.36 | \$59.95 |
| Pointers, Caulkers, Cleaners | 12/1/2024 | | \$39.69 | \$21.61 | \$61.30 |
| Roofers | 6/1/2023 | | \$37.00 | \$19.92 | \$56.92 |
| Roofers | 6/2/2024 | | \$38.00 | \$20.67 | \$58.67 |
| Sheet Metal Workers | 8/1/2023 | | \$41.00 | \$32.94 | \$73.94 |
| Sheet Metal Workers | 7/1/2024 | | \$43.00 | \$33.96 | \$76.96 |

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| Project: 25-02616 - Building | Effective Date | Expiration Date | Hourly Rate | Fringe Benefits | Total |
|-------------------------------------|-----------------------|------------------------|--------------------|------------------------|--------------|
| Sign Makers and Hangars | 7/15/2023 | | \$31.76 | \$24.63 | \$56.39 |
| Sign Makers and Hangars | 7/15/2024 | | \$32.32 | \$25.82 | \$58.14 |
| Sprinklerfitters | 7/1/2023 | | \$43.84 | \$25.50 | \$69.34 |
| Sprinklerfitters | 1/1/2024 | | \$43.28 | \$26.06 | \$69.34 |
| Sprinklerfitters | 7/1/2024 | | \$45.38 | \$26.46 | \$71.84 |
| Sprinklerfitters | 1/1/2025 | | \$44.79 | \$27.05 | \$71.84 |
| Steamfitters | 6/1/2023 | | \$46.10 | \$28.37 | \$74.47 |
| Steamfitters | 6/1/2024 | | \$48.15 | \$29.57 | \$77.72 |
| Stone Masons | 6/1/2024 | | \$42.35 | \$23.97 | \$66.32 |
| Stone Masons | 12/1/2024 | | \$43.10 | \$24.22 | \$67.32 |
| Terrazzo Finisher | 6/1/2023 | | \$39.79 | \$18.47 | \$58.26 |
| Terrazzo Finisher | 12/1/2024 | | \$41.04 | \$18.72 | \$59.76 |
| Terrazzo Mechanics | 12/1/2022 | | \$35.49 | \$20.32 | \$55.81 |
| Terrazzo Mechanics | 6/1/2024 | | \$39.14 | \$20.77 | \$59.91 |
| Terrazzo Mechanics | 12/1/2024 | | \$40.39 | \$21.02 | \$61.41 |
| Tile Finisher | 12/1/2022 | | \$28.76 | \$17.34 | \$46.10 |
| Tile Finisher | 6/1/2024 | | \$31.56 | \$17.74 | \$49.30 |
| Tile Finisher | 12/1/2024 | | \$32.51 | \$17.99 | \$50.50 |
| Tile Setter | 12/1/2022 | | \$35.64 | \$21.81 | \$57.45 |
| Tile Setter | 6/1/2024 | | \$38.46 | \$22.19 | \$60.65 |
| Tile Setter | 12/1/2024 | | \$39.41 | \$22.44 | \$61.85 |
| Truckdriver class 1(see notes) | 1/1/2023 | | \$33.18 | \$22.21 | \$55.39 |
| Truckdriver class 1(see notes) | 1/1/2024 | | \$34.93 | \$22.71 | \$57.64 |
| Truckdriver class 1(see notes) | 1/1/2025 | | \$36.43 | \$23.21 | \$59.64 |
| Truckdriver class 1(see notes) | 1/1/2026 | | \$37.93 | \$23.71 | \$61.64 |
| Truckdriver class 2 (see notes) | 1/1/2023 | | \$33.64 | \$22.52 | \$56.16 |
| Truckdriver class 2 (see notes) | 1/1/2024 | | \$35.39 | \$23.02 | \$58.41 |
| Truckdriver class 2 (see notes) | 1/1/2025 | | \$36.89 | \$23.52 | \$60.41 |
| Truckdriver class 2 (see notes) | 1/1/2026 | | \$38.39 | \$24.02 | \$62.41 |
| Window Film / Tint Installer | 10/1/2019 | | \$25.00 | \$2.63 | \$27.63 |

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| Project: 25-02616 - Heavy/Highway | Effective Date | Expiration Date | Hourly Rate | Fringe Benefits | Total |
|---|-----------------------|------------------------|--------------------|------------------------|--------------|
| Carpenter | 1/1/2023 | | \$38.60 | \$20.59 | \$59.19 |
| Carpenter | 1/1/2024 | | \$40.10 | \$21.34 | \$61.44 |
| Carpenter | 1/1/2025 | | \$41.35 | \$22.09 | \$63.44 |
| Carpenter | 1/1/2026 | | \$42.60 | \$22.84 | \$65.44 |
| Carpenter Welder | 1/1/2023 | | \$40.10 | \$20.59 | \$60.69 |
| Carpenter Welder | 1/1/2024 | | \$41.60 | \$21.34 | \$62.94 |
| Carpenter Welder | 1/1/2025 | | \$42.85 | \$22.09 | \$64.94 |
| Carpenter Welder | 1/1/2026 | | \$44.10 | \$22.84 | \$66.94 |
| Carpenters - Piledriver/Welder | 1/1/2023 | | \$40.63 | \$21.22 | \$61.85 |
| Carpenters - Piledriver/Welder | 1/1/2024 | | \$42.13 | \$21.97 | \$64.10 |
| Carpenters - Piledriver/Welder | 1/1/2025 | | \$43.38 | \$22.72 | \$66.10 |
| Carpenters - Piledriver/Welder | 1/1/2026 | | \$44.63 | \$23.47 | \$68.10 |
| Cement Finishers | 1/1/2023 | | \$34.14 | \$25.05 | \$59.19 |
| Cement Finishers | 1/1/2024 | | \$35.14 | \$26.30 | \$61.44 |
| Cement Finishers | 1/1/2025 | | \$35.94 | \$27.50 | \$63.44 |
| Cement Masons | 1/1/2020 | | \$32.84 | \$21.10 | \$53.94 |
| Electric Lineman | 5/29/2023 | | \$52.56 | \$29.99 | \$82.55 |
| Electric Lineman | 6/3/2024 | | \$53.97 | \$31.05 | \$85.02 |
| Electricians & Telecommunications Installation Technician | 12/22/2023 | | \$48.61 | \$31.80 | \$80.41 |
| Electricians & Telecommunications Installation Technician | 12/27/2024 | | \$51.76 | \$31.80 | \$83.56 |
| Electricians & Telecommunications Installation Technician | 12/26/2025 | | \$55.06 | \$31.80 | \$86.86 |
| Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing) | 6/1/2023 | | \$38.89 | \$35.02 | \$73.91 |
| Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing) | 6/1/2024 | | \$39.89 | \$36.47 | \$76.36 |
| Laborers (Class 01 - See notes) | 1/1/2023 | | \$29.95 | \$25.50 | \$55.45 |
| Laborers (Class 01 - See notes) | 1/1/2024 | | \$32.20 | \$25.50 | \$57.70 |
| Laborers (Class 01 - See notes) | 1/1/2025 | | \$33.70 | \$26.00 | \$59.70 |
| Laborers (Class 01 - See notes) | 1/1/2026 | | \$34.70 | \$27.00 | \$61.70 |
| Laborers (Class 02 - See notes) | 1/1/2023 | | \$30.11 | \$25.50 | \$55.61 |
| Laborers (Class 02 - See notes) | 1/1/2024 | | \$32.36 | \$25.50 | \$57.86 |
| Laborers (Class 02 - See notes) | 1/1/2025 | | \$33.86 | \$26.00 | \$59.86 |
| Laborers (Class 02 - See notes) | 1/1/2026 | | \$34.86 | \$27.00 | \$61.86 |
| Laborers (Class 03 - See notes) | 1/1/2023 | | \$30.50 | \$25.50 | \$56.00 |
| Laborers (Class 03 - See notes) | 1/1/2024 | | \$32.75 | \$25.50 | \$58.25 |
| Laborers (Class 03 - See notes) | 1/1/2025 | | \$34.25 | \$26.00 | \$60.25 |
| Laborers (Class 03 - See notes) | 1/1/2026 | | \$35.25 | \$27.00 | \$62.25 |
| Laborers (Class 04 - See notes) | 1/1/2023 | | \$30.95 | \$25.50 | \$56.45 |
| Laborers (Class 04 - See notes) | 1/1/2024 | | \$33.20 | \$25.50 | \$58.70 |
| Laborers (Class 04 - See notes) | 1/1/2025 | | \$34.70 | \$26.00 | \$60.70 |
| Laborers (Class 04 - See notes) | 1/1/2026 | | \$35.70 | \$27.00 | \$62.70 |
| Laborers (Class 05 - See notes) | 1/1/2023 | | \$31.36 | \$25.50 | \$56.86 |
| Laborers (Class 05 - See notes) | 1/1/2024 | | \$33.61 | \$25.50 | \$59.11 |

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| Project: 25-02616 - Heavy/Highway | Effective Date | Expiration Date | Hourly Rate | Fringe Benefits | Total |
|--|-----------------------|------------------------|--------------------|------------------------|--------------|
| Laborers (Class 05 - See notes) | 1/1/2025 | | \$35.11 | \$26.00 | \$61.11 |
| Laborers (Class 05 - See notes) | 1/1/2026 | | \$36.11 | \$27.00 | \$63.11 |
| Laborers (Class 06 - See notes) | 1/1/2023 | | \$28.20 | \$25.50 | \$53.70 |
| Laborers (Class 06 - See notes) | 1/1/2024 | | \$30.45 | \$25.50 | \$55.95 |
| Laborers (Class 06 - See notes) | 1/1/2025 | | \$31.95 | \$26.00 | \$57.95 |
| Laborers (Class 06 - See notes) | 1/1/2026 | | \$32.95 | \$27.00 | \$59.95 |
| Laborers (Class 07 - See notes) | 1/1/2023 | | \$30.95 | \$25.50 | \$56.45 |
| Laborers (Class 07 - See notes) | 1/1/2024 | | \$33.20 | \$25.50 | \$58.70 |
| Laborers (Class 07 - See notes) | 1/1/2025 | | \$34.70 | \$26.00 | \$60.70 |
| Laborers (Class 07 - See notes) | 1/1/2026 | | \$35.70 | \$27.00 | \$62.70 |
| Laborers (Class 08 - See notes) | 1/1/2023 | | \$32.45 | \$25.50 | \$57.95 |
| Laborers (Class 08 - See notes) | 1/1/2024 | | \$34.70 | \$25.50 | \$60.20 |
| Laborers (Class 08 - See notes) | 1/1/2025 | | \$36.20 | \$26.00 | \$62.20 |
| Laborers (Class 08 - See notes) | 1/1/2026 | | \$37.20 | \$27.00 | \$64.20 |
| Millwright | 6/1/2023 | | \$45.50 | \$23.72 | \$69.22 |
| Millwright | 6/1/2024 | | \$47.59 | \$23.72 | \$71.31 |
| Millwright | 6/1/2025 | | \$49.72 | \$23.72 | \$73.44 |
| Operators (Class 01 - see notes) | 1/1/2023 | | \$36.79 | \$23.58 | \$60.37 |
| Operators (Class 01 - see notes) | 1/1/2024 | | \$38.59 | \$24.03 | \$62.62 |
| Operators (Class 01 - see notes) | 1/1/2025 | | \$40.39 | \$24.23 | \$64.62 |
| Operators (Class 01 - see notes) | 1/1/2026 | | \$41.96 | \$24.66 | \$66.62 |
| Operators (Class 02 -see notes) | 1/1/2023 | | \$36.53 | \$23.58 | \$60.11 |
| Operators (Class 02 -see notes) | 1/1/2024 | | \$38.33 | \$24.03 | \$62.36 |
| Operators (Class 02 -see notes) | 1/1/2025 | | \$40.13 | \$24.23 | \$64.36 |
| Operators (Class 02 -see notes) | 1/1/2026 | | \$41.70 | \$24.66 | \$66.36 |
| Operators (Class 03 - See notes) | 1/1/2023 | | \$32.88 | \$23.58 | \$56.46 |
| Operators (Class 03 - See notes) | 1/1/2024 | | \$34.68 | \$24.03 | \$58.71 |
| Operators (Class 03 - See notes) | 1/1/2025 | | \$36.48 | \$24.23 | \$60.71 |
| Operators (Class 03 - See notes) | 1/1/2026 | | \$38.05 | \$24.66 | \$62.71 |
| Operators (Class 04 - See notes) | 1/1/2023 | | \$32.42 | \$23.58 | \$56.00 |
| Operators (Class 04 - See notes) | 1/1/2024 | | \$34.22 | \$24.03 | \$58.25 |
| Operators (Class 04 - See notes) | 1/1/2025 | | \$36.02 | \$24.23 | \$60.25 |
| Operators (Class 04 - See notes) | 1/1/2026 | | \$37.59 | \$24.66 | \$62.25 |
| Operators (Class 05 - See notes) | 1/1/2023 | | \$32.17 | \$23.58 | \$55.75 |
| Operators (Class 05 - See notes) | 1/1/2024 | | \$33.97 | \$24.03 | \$58.00 |
| Operators (Class 05 - See notes) | 1/1/2025 | | \$35.77 | \$24.23 | \$60.00 |
| Operators (Class 05 - See notes) | 1/1/2026 | | \$37.34 | \$24.66 | \$62.00 |
| Operators Class 1-A | 1/1/2023 | | \$39.79 | \$23.58 | \$63.37 |
| Operators Class 1-A | 1/1/2024 | | \$41.59 | \$24.03 | \$65.62 |
| Operators Class 1-A | 1/1/2025 | | \$43.39 | \$24.23 | \$67.62 |
| Operators Class 1-A | 1/1/2026 | | \$44.96 | \$24.66 | \$69.62 |
| Operators Class 1-B | 1/1/2023 | | \$38.79 | \$23.58 | \$62.37 |
| Operators Class 1-B | 1/1/2024 | | \$40.59 | \$24.03 | \$64.62 |
| Operators Class 1-B | 1/1/2025 | | \$42.39 | \$24.23 | \$66.62 |

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

| Project: 25-02616 - Heavy/Highway | Effective Date | Expiration Date | Hourly Rate | Fringe Benefits | Total |
|---|-----------------------|------------------------|--------------------|------------------------|--------------|
| Operators Class 1-B | 1/1/2026 | | \$43.96 | \$24.66 | \$68.62 |
| Painters Class 1 (see notes) | 6/1/2022 | | \$34.45 | \$22.82 | \$57.27 |
| Painters Class 2 (see notes) | 6/1/2023 | | \$36.01 | \$24.01 | \$60.02 |
| Painters Class 2 (see notes) | 6/1/2024 | | \$38.09 | \$24.93 | \$63.02 |
| Painters Class 2 (see notes) | 6/1/2025 | | \$40.36 | \$25.81 | \$66.17 |
| Painters Class 3 (see notes) | 6/1/2023 | | \$38.33 | \$24.01 | \$62.34 |
| Painters Class 3 (see notes) | 6/1/2024 | | \$40.66 | \$24.93 | \$65.59 |
| Painters Class 3 (see notes) | 6/1/2025 | | \$43.69 | \$25.81 | \$69.50 |
| Painters Class 4 (see notes) | 6/1/2019 | | \$28.20 | \$20.06 | \$48.26 |
| Painters Class 5 (see notes) | 6/1/2019 | | \$22.91 | \$20.06 | \$42.97 |
| Pile Driver Divers (Building, Heavy, Highway) | 1/1/2023 | | \$58.70 | \$21.22 | \$79.92 |
| Pile Driver Divers (Building, Heavy, Highway) | 1/1/2024 | | \$60.95 | \$21.97 | \$82.92 |
| Pile Driver Divers (Building, Heavy, Highway) | 1/1/2025 | | \$62.82 | \$22.72 | \$85.54 |
| Pile Driver Divers (Building, Heavy, Highway) | 1/1/2026 | | \$64.70 | \$23.47 | \$88.17 |
| Piledrivers | 1/1/2023 | | \$39.13 | \$21.22 | \$60.35 |
| Piledrivers | 1/1/2024 | | \$40.63 | \$21.97 | \$62.60 |
| Piledrivers | 1/1/2025 | | \$41.88 | \$22.72 | \$64.60 |
| Piledrivers | 1/1/2026 | | \$43.13 | \$23.47 | \$66.60 |
| Steamfitters (Heavy and Highway - Gas Distribution) | 5/1/2022 | | \$48.43 | \$40.28 | \$88.71 |
| Truckdriver class 1(see notes) | 1/1/2023 | | \$33.18 | \$22.21 | \$55.39 |
| Truckdriver class 1(see notes) | 1/1/2024 | | \$34.93 | \$22.71 | \$57.64 |
| Truckdriver class 1(see notes) | 1/1/2025 | | \$36.43 | \$23.21 | \$59.64 |
| Truckdriver class 1(see notes) | 1/1/2026 | | \$37.93 | \$23.71 | \$61.64 |
| Truckdriver class 2 (see notes) | 1/1/2023 | | \$33.64 | \$22.52 | \$56.16 |
| Truckdriver class 2 (see notes) | 1/1/2024 | | \$35.39 | \$23.02 | \$58.41 |
| Truckdriver class 2 (see notes) | 1/1/2025 | | \$36.89 | \$23.52 | \$60.41 |
| Truckdriver class 2 (see notes) | 1/1/2026 | | \$38.39 | \$24.02 | \$62.41 |

Project Labor Agreement

February 15, 2011

ARTICLE I

INTENT AND DURATION

Section 1. Intent and Duration. This Project Labor Agreement (the "Agreement") is entered into between the Community College of Allegheny County ("CCAC"); [Name of Contractor] as [Trade] Contractor and the Pittsburgh Regional Building and Construction Trades Council of Pittsburgh, AFL-CIO ("BCTC"); and the Signatory Unions (the "Unions") and applies exclusively to the construction work within the scope of this Agreement to be performed on the CCAC's BID PROPOSAL. (the "Project"). The purpose of this Agreement is to promote efficiency in the construction of the Project and to provide for the peaceful settlement of any and all labor disputes and grievances without strikes or lockouts, thereby promoting the public interest in assuring the timely and economical completion of the Project

Upon execution of this Agreement by all parties, all construction work covered by this Agreement on the Project shall be contracted exclusively to Contractors who agree to execute and be bound by the terms of this Agreement. The Unions agree that other Contractors may execute the Agreement for purposes of performing such work. The Prime Contractors shall monitor compliance with this Agreement by all contractors, who through their execution of a Letter of Assent hereto, together with their subcontractors, shall become bound hereto. For purposes of this Agreement, the term "Contractor" shall be deemed to include all Prime construction contractors and subcontractors of whatever tier engaged in on-site construction work on the Project.

The Prime Contractors, the Unions and all signatory Contractors agree to abide by the terms and conditions contained in the Agreement. This Agreement represents the complete understanding of all parties, and no Contractor is or will be required to sign any other agreement with a signatory union as a condition of performing work coming within the scope of this Agreement. No practice, understanding or agreement between a Contractor and a Union which is not specifically set forth in this Agreement will be binding on any other party unless endorsed in writing by the Prime Contractor.

Section 2. Limitation of Agreement to Project The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for work on the Project, without regard to whether that successful bidder performs work at other sites on either a union or a non-union basis, and without regard to whether employees of such bidder are or are not members of any union. The Unions further agree that this Agreement applies only to this Project, and that by signing the Letter of Assent hereto, a Contractor, not previously in signed agreement with the Unions, does not recognize the Unions as the bargaining representative of any of its employees at any other project, site or location. It is the intent of this Agreement that Contractors who sign it will create a relationship with the Unions governed by the provisions of Section 8(f) of the Labor Management Relations Act, 29 U.S.C. §158(f).

ARTICLE II

PURPOSE

Section 1. Purpose. The parties signatory to this Agreement accordingly pledge their complete good faith and trust to work towards an absolutely on-time completion of the Project. The signatory parties further pledge to demonstrate nationally that Western Pennsylvania enjoys a mature labor relations climate and continues to be the number one location in the United States to live and work.

Section 2. Time is of the Essence. The parties to this Agreement understand and agree that time is of the essence for this Project. The parties understand and agree that the CCAC and the Prime Contractors have a critical need for timely completion of the Project, as the Project must be completed prior to (SEE SPECIFICATIONS). Timely completion of the Project without interruption or delay is therefore vital. The parties understand and agree that timely construction of the Project will require substantial numbers of employees from construction and supporting crafts possessing skills and qualifications that are essential to its completion; the Unions pledge that they have members who are competent, skilled, and qualified to perform the required construction work. The parties also understand that on-budget completion of the Project is most critical; it is therefore essential that construction work on the Project be done in an efficient, economical manner with optimum productivity and no delays. In recognition of those special needs of the Project, Unions signatory hereto and their members agree not to initiate, authorize, sanction, participate in or condone, or permit their members to engage in, any strike, sympathy strike, jurisdictional strike, recognition strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), hand billing, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project. Contractors agree not to engage in any lockouts.

ARTICLE III

BENEFITS OF THE AGREEMENT

Section 1. Benefits of the Agreement. This Agreement is intended to foster the achievement of a timely and on-budget completion of the Project by, among other things:

- (a) avoiding the costly delays of potential strikes, sympathy strikes, jurisdictional strikes, slowdowns, walkouts, picketing, handbilling and any other disruptions or interference with work, and promoting labor harmony and peace for the duration of the Project;
- (b) standardizing terms and conditions governing the employment of labor on the Project;
- (c) permitting a wide flexibility in work scheduling, shift hours, and starting times;
- (d) achieving negotiated adjustments as to work rules and staffing requirements from those which otherwise might obtain;
- (e) providing comprehensive and standardized mechanisms for the settlement of work disputes;
- (f) ensuring a reliable source of skilled and experienced labor; and
- (g) furthering public policy objectives; to the extent lawful, as to improved employment opportunities for the Minority Business Enterprises, Women Business Enterprises.

ARTICLE IV

SCOPE OF THE AGREEMENT

Section 1. The Work. This Agreement is specifically defined and limited to onsite construction work required to construct the Project.

Section 2. Exclusions from Scope. Items specifically excluded from the scope of this Agreement, even if performed in connection with the Project, include the following:

- (a) Work of non-manual employees, including but not limited to, superintendents, supervisors, staff engineers, inspectors, quality control and quality assurance personnel, timekeepers, mail carriers, clerks, office workers including messengers, guards, safety personnel, emergency medical and first aid technicians, and other professional, engineering, administrative, supervisory and management employees.
- (b) Equipment and machinery owned or controlled and operated by CCAC.
- (c) All off-site manufacture, fabrication or handling of materials, equipment or machinery (except at dedicated lay-down or storage areas), and all deliveries of any type to and from the Project site.
- (d) All employees of CCAC; the Prime Contractors, the design team or any other consultant when such employees do not perform manual labor coming within the scope of this Agreement.
- (e) Any work performed on or near or leading to or onto the site of work on the Project and undertaken by state, county, city or other governmental bodies, or their contractors; or by public utilities or their contractors.
- (f) Off-site maintenance of leased equipment and on-site supervision of all such maintenance work.
- (g) Work by employees of a manufacturer or vendor necessary to maintain such manufacturer's or vendor's warranty or guarantee, unless such work has historically and customarily been performed by members of a signatory union, or work performed by supervisors or technicians employed by the manufacturer or vendor to oversee the testing of equipment once installed to insure that the equipment is fully operational.
- (h) Laboratory work for specialty testing or inspections not ordinarily done by the signatory local unions.
- (i) All work done by employees of CCAC, or of any State agency, authority or entity or employees of any municipality or other public employer.
- (j) All employees and entities engaged in ancillary Project work performed by electric utilities, gas utilities and telephone companies.
- (k) It is further agreed that, where there is a conflict, the terms and conditions of this Project Agreement shall supersede and override terms and conditions of any and all other national, area, or local collective bargaining agreements, except for all work performed under the NTL Articles of Agreement. The National Stack/Chimney Agreement, and the National Cooling Tower Agreement, all instrument calibration work and loop

checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Article 8 (Work Stoppages and Lockouts); Article 10 (Grievance & Arbitration Procedure); and Article 11 (Jurisdictional Disputes) of this Project Agreement, which shall apply to such work. (see attached model PLA-Article II, Section 1)

The Unions agree that there shall be no interference with, or disruption of work, of those contractors, employers and employees exempted from coverage of this Agreement by subparagraph (a) through (k) above.

Section 3. Contract Award and Consent to Agreement.

- (a) The Prime Contractors, and/or Contractors, as appropriate have the absolute right to award contracts or subcontracts on the Project notwithstanding the existence or nonexistence of any Agreements between such contractor and any Union party provided only that such Contractor is willing, ready and able to execute and comply with this Agreement or a Letter of Assent thereto, should such Contractor be awarded work covered by this Agreement.
- (b) All subcontractors of a Contractor, of whatever tier, who have been awarded contracts of work covered by this Agreement on or after the effective date of this Agreement shall also be required to accept to be bound by the terms and conditions of this Agreement, and shall evidence their acceptance by the execution of this Agreement or a Letter of Assent thereto, prior to the commencement of work. A copy of this Agreement or Letter of Assent executed by each Contractor shall be available for review by the Unions.

Section 4. Stand-Alone Agreement. This Agreement is a stand alone agreement. While this Agreement expressly does not incorporate any local area collective bargaining agreements, such local area collective bargaining agreements may be referenced for the limited purposes as hereinafter set forth in this Agreement. However, to the extent, if any, that any provisions of this Agreement conflict with any provision of a local area collective bargaining agreement, the provisions of this Agreement shall control.

Section 5. Craft Jurisdiction. This Agreement shall recognize the traditional craft jurisdictions of the signatory unions. Any and all jurisdictional disputes shall be settled in accordance with Article VIII below. While this Agreement is a stand-alone Agreement and expressly does not incorporate any local area collective bargaining agreements, the Agreement will utilize the local area collective bargaining agreements of signatory locals as a reference to define the signatory local unions' craft jurisdiction.

Section 6. Subcontracting. CCAC agrees that neither it nor any of its contractors or subcontractors will subcontract any work covered by this Agreement to be done on the Project except to a person, firm or corporation who is or agrees to become party to this Agreement. Any contractor or subcontractor working on the Project shall, as a condition to working on said Project, become a

signatory to and perform all work under the terms of this Agreement. Contractors who are signatory to local collective bargaining agreements shall be bound by the terms of their respective local collective bargaining agreements on subcontracting to the extent such terms are consistent with Article IV, Section 2 of this Agreement. Disputes concerning compliance with such local subcontracting provisions for this project shall be subject to all of the dispute resolution provisions of this Agreement.

Section 7. Liability. It is understood that the liability of the Contractor and the liability of the separate Unions under this Agreement shall be several and not joint. The Unions agree that this Agreement does not have the effect of creating any joint employer status between or among CCAC and/or any Contractor and CCAC shall not assume any liabilities of the Contractors.

Section 8. Abatement of Agreement. As areas of covered work on the Project are accepted by CCAC, this Agreement shall have no further force or effect on such areas except where the Contractor is directed by CCAC to engage in repairs or punch list modifications.

ARTICLE V

LABOR/MANAGEMENT COOPERATION JOINT ADMINISTRATIVE COMMITTEE

Section 1. The parties to this Agreement shall establish a Project Joint Administrative Committee ("Committee"). This Committee will be a three-person committee comprised of one member each from the Prime Contractor, from CCAC, and from the signatory Unions, with an alternate signatory Union member available to replace the regular volunteer when a problem or grievance concerns the regular member's Union. The members of the Project Joint Administrative Committee shall be appointed by their respective principals at a time to be determined after the time the Prime Contracts are awarded. Each member of the Committee shall designate an alternate who shall serve in the absence of the member for any purpose contemplated by this Agreement.

Section 2. The Committee shall meet at least quarterly or more often if special circumstances warrant, to discuss the administration of the Agreement, the progress of the Project, labor/management problems that may arise, and any other relevant matters. Any need for interpretation which might arise from the application of the terms and conditions of the Agreement shall be referred directly to the Committee for resolution.

ARTICLE VI

UNION RECOGNITION AND EMPLOYMENT

Section 1. Pre-Hire Recognition. Each Contractor recognizes the Unions as the sole and exclusive bargaining representative of all craft employees within their respective jurisdictions working on the Project under the Agreement. It is contemplated that such recognition under this Agreement is pursuant to the provisions of Section 8(f) of the Labor Management Relations Act, 29 U.S.C. §158(f) unless the signatory Contractor and Unions have another, preexisting legal relationship.

Section 2. Contractor's Right of Selection. Each Contractor shall have the right to determine the competency of all employees, the number of employees required and shall have the sole responsibility for selecting employees to be laid off.

Section 3. Union Referral. For Local Unions having a job referral system, each Contractor agrees to comply with such system, and the referral system shall be used exclusively by such Contractor, except as modified by this Article. Such job referral system will be operated in a non-discriminatory manner and in full compliance with Federal, State, and Local laws and regulations requiring equal employment opportunities and non-discrimination, and referrals shall not be affected in any way by the rules, regulations, by-laws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements. The Union shall indemnify and hold each Contractor harmless with respect to any claim arising out of how the Union operates and administers its referral system. All hiring procedures, including related practices affecting apprenticeship and training, will be operated so as to facilitate the ability of the contractors to meet any and all equal employment opportunity/affirmative action obligations. The Contractor may reject any referral for any reason and request another, different referral.

Section 4. Lack of Job Referral System. In the event that a signatory Local Union does not have a job referral system as set forth in Section 3 above, the Contractor shall give the Union forty-eight (48) hours to refer applicants. The Contractor may reject any referral for any reason and request another, different referral. The Contractor shall notify the Union of employees hired from any source other than referral by the Union.

Section 5. Unavailability of Union Referrals. In the event that Local Unions are unable to fill any requisitions for qualified employees within forty-eight (48) hours after such requisition is made by the Contractor (Saturdays, Sundays, and Holidays excepted), the Contractor may employ applicants from any other available source. The Contractor shall inform the Union of the name and social security number of any applicants hired from other sources and refer the applicant to the Local Union for dispatch to the Project.

Section 6. No Cross-Referrals. The Local Unions shall not knowingly refer an employee currently employed by any Contractor working under this Agreement to any other Contractor, nor shall any Union engage in any activity which encourages workforce turnover or absenteeism.

Section 7. Union Best Efforts. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled craft workers to fulfill the manpower requirements of each Contractor, including calls to local unions in other geographical areas when its referral lists have been exhausted.

Section 8. Non-Discrimination. No employee covered by this Agreement shall be required to join any Union or pay any agency fees or dues as a condition of being employed, or remaining employed, on the Project. Where, however, there is in effect and in the possession of the Contractor a voluntary written dues deduction authorization executed by the employee on a standard form furnished by the Union, the Contractor agrees to deduct union dues from the pay of the employee and to remit the dues to the Union at the same time that trust fund contributions are required to be remitted to the administrators of the appropriate trust funds on behalf of that employee.

Section 9. Core Employees. To provide opportunities to participate on the Project to minority and women owned business enterprises as well as other enterprises which do not have a relationship with the Unions signatory to this Agreement and to ensure that such enterprises will have an opportunity to employ their "core" employees on this Project, the parties agree that any such enterprise has the right to select core employees whom it will employ on site, in accordance with the formula below and who:

- (a) possess any license required by the state or federal law for the Project work to be performed;
- (b) have worked a total of at least 1,200 hours per year in the construction craft during each of the prior 3 years, including participating in a state certified apprenticeship program;
- (c) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award;
- (d) have the ability to perform safely the basic functions of the applicable trade.

The first employee and the third employee, or up to ten (10) percent of all employees, whichever is greater, hired by each contractor may be core employees. After such core employees have been hired by any contractor, all the employees shall thereafter be hiring hall referrals by the appropriate signatory unions in accordance with the provisions of the applicable local collective bargaining agreements.

Section 10. Craft and General Forepersons. The selection of craft foreman and/or general foreman and the number foreman required shall be the exclusive right and responsibility of each contractor.

ARTICLE VII

DISPUTES AND GRIEVANCES

Section 1. This Agreement is intended to provide close cooperation between management and labor. Each of the Unions will assign a representative to this Project for the purpose of completing the construction of the Project economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

Section 2. The Contractors, Unions and the employees, collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

Section 3. Any question or dispute arising out of and during the term of this Project Agreement (other than trade jurisdictional disputes) shall be considered a grievance and subject to resolution under the following procedures:

Step 1. (a) When any employee subject to the provisions of this Agreement feels he or she is aggrieved by a violation of this Agreement, he or she, through his or her local union business representative or job steward, shall, within five (5) working days after the occurrence of the

violation, give notice to the work-site representative of the involved Contractor stating the provision(s) alleged to have been violated. The business representative of the local union or the job steward and the work-site representative of the involved Contractor and the Prime Contractor shall meet and endeavor to adjust the matter within three (3) working days after timely notice has been given.

The representative of the Contractor shall keep the meeting minutes and shall respond to the Union representative in writing (copying the Prime Contractor) at the conclusion of the meeting but not later than twenty-four (24) hours thereafter. If they fail to resolve the matter within the prescribed period, the grieving party may, within forty-eight (48) hours thereafter, pursue Step 2 of the Grievance Procedure, provided the grievance is reduced to writing, setting forth the relevant information concerning the alleged grievance, including a short description thereof, the date on which the grievance occurred, and the provision(s) of the Agreement alleged to have been violated.

(b) Should the Local Union(s) or the Prime Contractor or any Contractor have a dispute with the other party and, if after conferring, a settlement is not reached within three (3) working days, the dispute may be reduced to writing and proceed to Step 2 in the same manner as outlined herein for the adjustment of an employee complaint.

Step 2. The International Union Representative and the involved Contractor shall meet within seven (7) working days of the referral of a dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. If the parties fail to reach an agreement, the dispute may be appealed in writing in accordance with the provisions of Step 3 within seven (7) calendar days thereafter.

Step 3. (a) If the grievance has been submitted but not adjusted under Step 2, either party may request in writing, within seven (7) calendar days thereafter, that the grievance be submitted to an Arbitrator mutually agreed upon by them. The Contractor and the involved Union shall attempt mutually to select an arbitrator, but if they are unable to do so, they shall request the American Arbitration Association to provide them with a list of arbitrators from which the Arbitrator shall be selected. The rules of the American Arbitration Association shall govern the conduct of the arbitration hearing. The decision of the Arbitrator shall be final and binding on all parties. The fee and expenses of such Arbitration shall be borne equally by the Contractor and the involved Local Union(s).

(b) Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The Arbitrator shall have the authority to make decisions only on issues presented to him or her, and he or she shall not have authority to change, amend, add to or detract from any of the provisions of this Agreement.

Section 4. The Prime Contractor and Owner shall be notified of all actions at Steps 2 and 3 and shall, upon their request, be permitted to participate in all proceedings at these steps.

ARTICLE VIII

JURISDICTIONAL DISPUTES

Section 1. The assignment of work will be solely the responsibility of the Contractor performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor Plan.

Section 2. All jurisdictional disputes on this Project, between or among Building and Construction Trades Unions and employers shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final binding and conclusive on the Contractors and Unions parties to this Agreement.

Section 3. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

Section 4. Each Contractor will conduct a pre-job conference with the appropriate Building and Construction Trades Council prior to commencing work. The Prime Contractor and the Owner will be advised in advance of all such conferences and may participate if they wish.

ARTICLE IX.

MANAGEMENT'S RIGHTS

Section 1. Exclusive Authority – Workforce. The Prime Contractors retain the full and exclusive authority for the management of their operations and workforces. The Prime Contractors retain the right to plan, direct, and control the workforce, including the hiring, promotion, demotion, transfer, layoff, suspension, discipline or discharge for just cause of employees; the determination of crew make-up, crew size and manning levels; the selection of foremen, the assignment and scheduling of work; the promulgation of work rules; and the requirement of overtime work, the determination of when it will be worked and the number and identity of employees engaged in such work. No rules, customs, or practices which limit or restrict productivity, efficiency of the individual and/or joint working efforts of employees shall be permitted or observed. The Prime Contractors may utilize any methods or techniques of construction and operation.

Section 2. Materials, Design, Machinery, Equipment. There shall be no limitation or restriction by a signatory Union upon a Contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization of equipment, machinery packaging, pre-cast, pre-fabricated, pre-finish, or pre-assembled materials, tools or other labor saving devices. The on-site installation or application of all items shall be performed by the craft having jurisdiction of such work;

provided, however, that installation of specialty items may be performed by employees employed under this Agreement who may be directed by other personnel in a supervisory role, in circumstances requiring special knowledge of the particular items.

Section 3. Specialty Work. It is recognized by the Contractors, the Unions, and their members that the performance of certain work on the Project shall consist of the installation of certain materials, equipment, or supplies manufactured outside this local vicinity which must, for warranty purposes, be installed by the manufacturer and/or designated specialty contractors and that such installation work is not customarily performed by the members of such unions. The Unions and their members agree that they shall make no claims for such work; provided, however, that the Prime Contractors and/or the Joint Administrative Committee shall provide them with the necessary information establishing the nature of such specialty work.

Section 4. New Technology, Equipment. The use of new technology, equipment, machinery, tools and/or labor saving devices and methods of performing work may be initiated by any Contractor from time to time during the Project. The Union agrees that it will not in any way restrict the implementation of such new devices or work methods.

Section 5. Disputes. If there is any disagreement between any Contractor and the Union concerning the manner or implementation of such device or method of work, the implementation shall proceed as directed by the Contractor, and the Union shall have the right to grieve and/or arbitrate the dispute as set forth in Article VII of this Agreement.

ARTICLE X.

WORK STOPPAGES

Section 1. No Strikes or Work Disruptions. There shall be no strike, sympathy strike, jurisdictional strike, recognitional strike, slowdown, sabotage, work to rule, sickout, sitdown, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project. The Unions signatory hereto, and each of their members, agree not to initiate, authorize, sanction, participate in, condone, or permit their members to engage in any such activity. Failure of any Union or employee covered by this Agreement to cross any picket line established by any Union, signatory or non-signatory to the Agreement, or by any other organization or individual at or in proximity to the Project construction site, is a violation of this Article. The signatory Union shall be responsible for any action of its members, which violates this section, and its members shall be subject to discipline up to and including discharge for violation of the provisions of this article.

Section 2. Union Responsibilities. The Union shall not sanction, aid or abet, encourage or condone any conduct or activity in violation of this Article, and shall undertake all means to prevent or to terminate any such conduct immediately. No employee shall engage in activities which violate this Article, and the Union shall pursue all disciplinary action permitted by its Constitution and By-laws against any employee who engages in any activity which violates this Article.

Section 3. Violation. If any Contractor and/or CCAC contends that any Union or its member(s) has violated this Article, it will notify in writing the International President(s) of the Union(s) involved, advising him of the fact, with copies of such notice to the Local Union(s) involved, and the BCTC. The International President or Presidents will immediately instruct, order and use the best efforts of his office, including discipline procedures under its Constitution and By-laws, to cause the Local Union(s) or its members to cease any violation of this Article.

Section 4. Expedited Arbitration. Should CCAC, Prime Contractor or any Contractor believe that there has been any violation of this Article, it may institute this expedited arbitration procedure (in addition to any action at law or in equity, or any other contractual procedure available to it). The parties to this Agreement have agreed that the Labor Arbitration Rules of the American Arbitration Association shall apply, including the Rules governing Expedited Arbitration. The Arbitrator shall hold a hearing within twenty-four (24) hours of verbal or written notice of a claimed violation of this Article and shall complete the hearing in one session. The sole issue at the hearing shall be whether or not a violation of this article has occurred. The Arbitrator shall have no authority to consider any matter in justification, explanation, or mitigation of such violation. The arbitral award shall be issued in writing within three (3) hours after the close of the hearing and may be issued without opinion. If any party desires an opinion, the arbitrator shall issue one within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the award.

ARTICLE XI

WAGE AND BENEFITS

Section 1. Classification – Wages. All employees covered by this Agreement shall be classified in accordance with work performed and paid the prevailing wage and benefit rates for these classifications. The Prime Contractors, upon request, shall provide the Unions with substantiation that prevailing wages and benefits are being paid by Contractors on the Project.

Section 2. Payment of Benefits/Contribution. Each Contractor will also pay all required contributions in the amounts required by Section 1 of this Article to the established employee benefit funds that accrue to the direct benefit of the employees (such as pension and annuity, health and welfare, vacation, apprenticeship, training funds). With respect to contributions required in this Section to Employer-Union jointly trusted funds, the Contractor adopts and agrees to be bound by the written terms of the legally established trust agreement specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractor authorizes the parties to such Trust Funds to appoint Trustees and successor Trustees to administer the Trust Funds and hereby ratifies and accepts the Trustees and successor Trustees to administer the Trust Funds and hereby ratifies and accepts the Trustees so appointed as if made by Contractor. This section does not apply to core employees unless any core employee voluntarily elects to join and become a member of any local union signatory to this Agreement, in which event this Section shall immediately apply with respect to any such core employee.

ARTICLE XII

LOCAL UNION NEGOTIATIONS DURING THE PENDENCY OF THE AGREEMENT

Section 1. All parties to this Agreement understand and acknowledge that some crafts who will be working on the Project are covered by local collective bargaining agreements that will expire prior to the projected completion of the project. All contracting parties understand and agree that irrespective of whether such local collective bargaining agreement negotiations are successful or unsuccessful, there shall be no strike, sympathy strike, jurisdictional strike, recognitional strike slowdown, sabotage, work to rule, sickout, sitdown, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project by any Union involved in such local negotiations, or by any of its members, nor shall there be any lockout on the Project affecting such union or its members during the course of such negotiations. Irrespective of the status of any such local collective bargaining agreement negotiations, the affected Union and all of its members will observe and fully comply with the provisions of this Agreement.

Section 2. Wage/Benefit Increases. Should a craft covered by this Agreement negotiate an increase in wages or an increase in benefits with any Contractor to become effective during the term of the Project for the area of Western Pennsylvania, those wage and/or benefit increases shall be paid, as of the effective date of those increases, to those employees in that craft performing work covered by this Agreement.

ARTICLE XIII

HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAYS

Section 1. Work Day and Work Week. Except as provided in Section 4, the first shift shall consist of eight (8) or ten (10) hours per day between the hours of 6:00 a.m. and 5:30 p.m., plus one-half (1/2) hour for unpaid lunch, approximately mid-way through the shift. Forty (40) hours per week shall constitute a regular week's work, whether consisting of five (5) eight (8) hour days, or four (4) ten (10) hour days. The work week will start on Monday and conclude on Sunday. A uniform starting time will be established for all crafts on each project or segment of work. Nothing herein shall be construed as guaranteeing any employee eight (8) or ten (10) hours per day or forty (40) hours per week. The Union(s) shall be informed of the work starting time set by the contractor at the pre-job conference which may be changed thereafter upon three (3) days' notice to the Union(s) and the employees. A second shift, if used, shall consist of eight hours between the 3:00 p.m. and 1:00 a.m.; a third shift, if used, shall begin between 10:00 p.m. and 1:00 a.m. For the purposes of Section 3, the third shift shall be considered as part of the prior day's work.

Section 2. Starting Times. Employees shall be at their place of work at the starting time and shall remain at their place of work (as designated by the Contractor) performing their assigned functions until quitting time, which is defined as the scheduled end of the shift. The parties reaffirm their policy of a fair day's work for a fair day's wage. There shall be no pay for time not worked unless

the employee is otherwise engaged at the direction of the Contractor. Due to the magnitude of the project and congestion of the site, staggered starting times may be required. If necessary, these starting times would be between 6 AM and 8 AM. This policy could help reduce the transportation problems at start and completion times.

Section 3. Overtime. Overtime shall be defined as all hours worked in excess of forty (40) hours in a week, or for 8 hour shifts, in excess of 8 hours per day; or for 10 hour shifts, for work in excess of 10 hours per day; such work and work performed on Saturday shall be paid at one and one-half times the straight time rate of pay. However, in scheduled five day/eight hour shift work-weeks, Saturday may be scheduled as a "make-up" day at straight time to make up for a day lost (Monday through Friday) due to inclement weather; in scheduled four day/ten hour shift work weeks, Friday and/or Saturday may be scheduled as a "makeup" day at straight time to make up for a lost day (Monday through Thursday) due to inclement weather. In addition, if a makeup day is scheduled, all employees directed to work on such day will be guaranteed a minimum of four (4) hours work or pay. In any week in which employees on the Project are scheduled on four day/ten hour shifts, an employee whose first day of work on the projects begins on Wednesday, or a later day of the schedule shall be paid, during the first week of his employment only, time and a half for all hours worked in excess of eight in a day for each day he worked during said week. Work on Sundays and Holidays shall be at double time. There will be no restriction on any Contractor's scheduling of overtime or the non-discriminatory designation of employees who will work. The Contractor shall have the right to schedule work so as to minimize overtime. There shall be no pyramiding of overtime pay under any circumstances.

Section 4. Shifts.

- (a) Shift work may be performed at the option of the Contractor(s) upon three (3) days' prior notice to the Union and shall continue for a period of not less than five (5) working days. Saturdays and Sundays, if worked, may be used for establishing the five (5) day minimum work shift. If two shifts are worked, each shall consist of eight (8) hours of continuous work exclusive of a one-half (1/2) hour non-paid lunch period for eight (8) hours pay.
- (b) The Contractor may establish a work week of four (4) consecutive ten (10) hour work days (exclusive of one-half hour unpaid lunch, approximately midway through the shift) between Monday and Friday.

Section 5. Holidays. Recognized holidays on the Project shall be New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving Day, and Christmas Day. Work performed on holidays shall be paid at double the straight time rate of pay. A holiday falling on Sunday shall be observed the following Monday

Section 6. Meal Period. The Contractor will schedule a meal period of not more than one-half hour duration at the work location at approximately the mid-point of the scheduled work shift (4 hours in a five-day work week, 5 hours in a four-day work week), consistent with Section 1; provided, however, that the Contractor may, for efficiency of the operation, establish a schedule which coordinates the meal periods of two or more crafts. If an employee is required to work through his meal period, he shall be compensated for the time worked at the applicable overtime rate and the employee shall, when work permits, eat his lunch "on the fly."

Section 7. No Organized Work Breaks. There will be no organized breaks or other non-working time established during working hours. Individual nonalcoholic beverage containers will be permitted at the employee's work stations.

Section 8. Craft Worker Parking Facilities. Parking facilities or arrangements for employees working on the Project will be established by the Prime Contractors by the time work on the Project commences.

ARTICLE XIV

APPRENTICES AND HELMETS TO HARDHATS

Section 1. Need For. The parties recognize the need to maintain continuing support of programs designed to develop adequate numbers of competent workers in the construction industry. The Contractor(s) will accordingly employ apprentices in their respective crafts to perform work on the Project within the apprentices' capabilities.

Section 2. Ratios. The Union agrees to cooperate with the Contractor in furnishing qualified apprentices as requested. There shall be no restrictions on the utilization of apprentices in performing the work of their craft provided they are properly supervised.

Section 3. The Employers and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Employers and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

Section 4. The Unions and Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

ARTICLE XV

DRUG AND ALCOHOL POLICY

Section 1. Policy. All parties understand and agree that a substance abuse program has been established by the Master Builders' Association of Western PA, Inc. (MBA) and/or the **Constructors Association of Western PA (CAWP)**, and will be in force for all work performed under the Agreement. The substance abuse program will prohibit the use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms while on the Project's premises and will require testing of employees. The substance abuse program will be incorporated into and made part of the Agreement and implemented for all Contractors and employees working on the Project.

ARTICLE XVI

NON-DISCRIMINATION

Section 1. Policy. It is the continuing policy of the Prime Contractors, the Contractors and the Unions that the provisions of this Agreement shall be applied without discrimination because of age, race, sex, color, religion, creed, national origin or union signatory or membership status. There shall be no discrimination against an employee because of her or his membership in, or activities on behalf of Unions.

ARTICLE XVII

SOLE AND COMPLETE AGREEMENT

Section 1. The parties agree that this Agreement constitutes the sole and complete agreement between them governing the rates of pay and working conditions of the construction employees working on the Project, that it settles all demands and issues on the matters subject to collective bargaining, and that it shall not be modified or supplemented in any way except by written agreement executed by both parties.

ARTICLE XVIII

SEPARABILITY AND SAVINGS CLAUSE

Section 1. Intent of Parties. If any article or section of this Agreement shall be held invalid by law or by a tribunal of competent jurisdiction, or if compliance with or enforcement of any article should be restrained pending a final determination as to its validity, the remainder of this Agreement shall not be affected and shall remain in full force and effect. In the event that any article or section is held invalid, the parties hereto shall, upon the request of the Unions, enter into collective bargaining negotiations for the purpose of arriving at a mutually satisfactory replacement for such article during the period of invalidity or restraint. If the parties hereto cannot agree on a mutually satisfactory replacement, either party shall be permitted to submit its demand to formal arbitration.

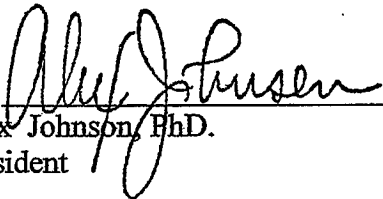
Section 2. Force of Agreement. The parties recognize the right of the CCAC to withdraw, at its absolute discretion, the utilization of this Agreement as part of any bid specification should a court of competent jurisdiction issue any order which could result, temporarily or permanently, in delay of the bidding, awarding, and/or construction work on the Project. Notwithstanding such an action by the Prime Contractors, or such court order, the parties agree that the Agreement shall remain in full force and effect on the Project, to the maximum extent legally possible.

This Project Labor Agreement is made as of this 15th day of February, 2011, by and between the Community College of Allegheny County and the Pittsburgh Regional Building and Construction Trades Council, AFL-CIO.

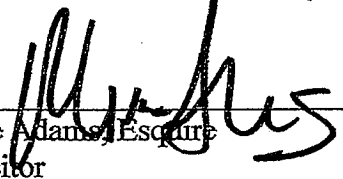
This Agreement replaces, in its entirety, that certain Labor Stabilization Agreement approved by the CCAC and the BCTC dated the 21st day of June, 1993 that covers all construction projects for which the CCAC acts as Owner.

The CCAC and BCTC, intending to be legally bound hereby, and for other good and valuable consideration the receipt and sufficiency of which the parties hereby acknowledged, agree to the above.


**Community College
Of Allegheny County**

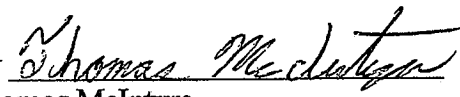
By 
Alex Johnson, PhD.
President

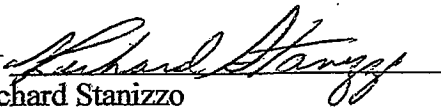
Approved as to Form and Legality:

By 
Mike Adams, Esquire
Solicitor

**Pittsburgh Regional Building
and Construction Trades Council,
AFL-CIO**

By 
William Brooks
President

By 
Thomas McIntyre
Secretary/Treasurer

By 
Richard Stanizzo
Business Manager

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE, PITTSBURGH PA 15233

Bond Number _____

PERFORMANCE BOND

Know all men by these Presents that we “TO BE COMPLETED ONLY BY AWARDEE”
(hereinafter called “Principal”) as Principal, and _____
authorized to do business in the Commonwealth of Pennsylvania (hereinafter called “Surety”) as Surety, are held
and firmly bound unto the Community College of Allegheny County, through its Board of Trustees,
_____ in the sum of _____

to be paid to the said College aforesaid, its certain attorney, or assigns. To which payment will and truly be made,
said principal and said surety to bind themselves their respective successors or assigns jointly and severally, firmly
by these presents.

WITNESS our hands and seals, the _____ day of _____ 20____.

WHEREAS the above bounded _____
_____ has filed with the Community College of Allegheny County,
proposals for the _____

The Condition of the above Obligation is such that if the said _____
shall perform _____

In accordance with the agreement between _____

and the Community College of Allegheny County of even date herewith and the specifications and proposals
attached to and made part of the agreement, and shall indemnify and save harmless the said Community College of
Allegheny County from all liens, charges, demands, loss and damages of every kind and nature, whatsoever. Then
this obligation to be void, otherwise to be and remain in full force and virtue.

Attest: _____ (SEAL)

CONTRACTOR

_____ (SEAL)

SECRETARY

PRESIDENT

Signed, Sealed and delivered in presence of

_____ (SEAL)

SURETY COMPANY

_____ (SEAL)

ADDRESS

_____ (SEAL)

TITLE

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE, PITTSBURGH PA 15233

LABOR AND MATERIAL

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That we _____ **"TO BE COMPLETED ONLY BY AWARDEE"** _____
_____ as Principal
hereinafter called Principal, and _____
_____ as Surety, hereinafter called Surety, are held and firmly bound unto the
COMMUNITY COLLEGE OF ALLEGHENY COUNTY, through its Board of Trustees as Obligee, hereinafter called Owner, for the use and benefit of claimants
as hereinbelow defined, in the amount of _____
_____ Dollars (\$ _____),
for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these
presents.

WHEREAS, Principal has by written agreement, dated _____ 20_____, entered into a contract with Owner
for _____
in accordance with drawings and specifications prepared by _____
(Here insert full name, title and address)
_____ which contract is by reference made a part hereof, and is
hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as
hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it
shall remain in full force and effect, subject, however, to the following conditions:

- (1) A claimant is defined as one having a direct contract with the Principal or with a sub-contractor of the Principal for labor, material, or both used or
reasonably required for use in the performance of the contract, labor and material being construed to include that part of water, gas, power, light, heat, oil,
gasoline, telephone service or rental of equipment directly applicable to the Contract.
- (2) The above-named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in
full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or
materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums
as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
- (3) No suit or action shall be commenced hereunder by any claimant.
 - (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The
Principal, the Owner, or the Surety above-named, within ninety (90) days after such claimant did or performed the last of the work or labor, or
furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party
to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same
by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is
regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the
aforesaid project is located, save that such service need not be made by a public officer.
 - (b) After the expiration of one (1) year following the date on which Principal ceased work on said Contract, it being understood, however, that if
any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended
so as to be equal to the minimum period of limitation permitted by such law.
 - (c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any
part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not
elsewhere.
- (4) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by
Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under
and against this bond.

Signed and sealed this _____ day of _____ 20_____

By _____
Witness _____ (Seal) Principal

By _____
Witness _____ (Seal) Surety

This bond is issued simultaneously with performance bond in favor of the Owner conditioned on the full and faithful performance of the Contract.

MASTER SERVICES AGREEMENT

“Awardee Only”

Bid 1138

THIS MASTER SERVICES AGREEMENT ("Agreement") is made and entered into as of this ____ day of _____, 2018, by and between **Community College of Allegheny County**, with a business office located at 800 Allegheny Avenue, Pittsburgh, PA 15233 (hereinafter referred to as the “College”), and _____ (hereinafter referred to as “Contractor”).

RECITALS

WHEREAS, the College has issued a Request for Quotation, Bid Solicitation, Request for Proposal, and/or a Purchase Order (hereinafter individually and collectively referred to as the “Order”), pursuant to

| | |
|-------------------------|---------------------|
| Bid Proposal No. | Awardee Only |
|-------------------------|---------------------|

which College seeks to procure certain work and services, as more fully described on the Order; and

WHEREAS, Contractor has submitted a proposal to the College to provide the services described in the Order, a copy of which is attached hereto as Exhibit A (hereinafter the “Proposal”) and incorporated by reference;

WHEREAS, the College desires to engage Contractor to provide the services, pursuant to and in accordance with the terms and conditions that this Agreement set forth herein.

NOW, THEREFORE, in consideration of the premises and covenants that this Agreement contains, the receipt and adequacy of which are hereby acknowledged, the parties, intending to be legally bound, agree as follows:

1. Term. The term of this Agreement shall be as specified in the Order unless otherwise stated in the section below. If no date is specified, this Agreement shall begin with the date first stated above and terminate upon satisfactory completion of the services described herein.

| |
|---------------------|
| AWARDEE ONLY |
|---------------------|

2. Services. Contractor shall fully and faithfully perform the work and services described in the Order and the Proposal and any specifications, scope of work or other documentation attached thereto. Contractor warrants that all work and services performed by or on behalf of it under this Agreement will conform to all terms and specifications set forth in the Order and in the Proposal.

3. Price/Fees: The College shall pay Contractor for the services and work performed by Contractor in accordance with the fees and/or prices set forth in the Proposal.

4. Terms and Conditions: This Agreement, and the services to be performed by Contractor hereunder, will be subject to and governed by College's Standard Terms and Conditions for the Purchase of Goods and Services ("Master Terms"), which are incorporated herein by reference. The Master Terms can be viewed and downloaded at <https://online.flippingbook.com/view/182546862>. By signing below, Contractor acknowledges its receipt and acceptance of the Master Terms.

5. Insurance Requirements: In addition to the Master Terms, Contractor shall comply with the insurance and indemnification requirements set forth on Exhibit B, which are incorporated herein by reference. Prior to commencing performance of the Services, Contractor shall furnish to the College a properly executed certificate(s) of insurance which evidence all insurance required by Exhibit B. Said certificate(s) of insurance shall be attached herein as Exhibit C.

6. Assignment. Contractor may not assign or subcontract this Agreement or its performance thereof, in whole or in part, without the College's prior written consent.

7. Entire Agreement; Modification. This Agreement, together with the Exhibits and other documents referenced and incorporated herein, sets forth the entire agreement of the parties on the subject matter hereof and supersedes all previous or concurrent agreements between them, whether oral or written. Any proposal, quotation, acknowledgment, confirmation or other writing submitted by Contractor to the College shall not be deemed to amend or modify this Agreement, and will be of no legal effect except to the extent that it serves to identify the work and services to be performed by the Contractor. This Agreement, and the terms set forth in the Master Terms, will control over any conflicting terms or provisions contained in any proposal, invoice or other documentation submitted by Contractor to College. The terms of this Agreement may not be modified or changed except by a writing that both parties sign. This Agreement shall inure to the benefit of the College and Contractor and the College's successors and assigns.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

AWARDEE ONLY – COMPANY NAME

**COMMUNITY COLLEGE
OF ALLEGHENY COUNTY**

By: _____

By: James Flynn

Signature: _____

Signature: _____

Title: _____

Title: Vice President for Finance

Date: _____

Date: _____

Revised 3/3/15

EXHIBITS - The following Exhibits are attached hereto and made a part of this Agreement for all purposes:

- Exhibit A - Contractor's Proposal Response**
- Exhibit B - Insurance Requirements**
- Exhibit C - Contractor's Certificate(s) of Insurance.**
- Exhibit D – Performance and Payment Bonds**
- Exhibit E – No-Lien Agreement**

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE, PITTSBURGH, PA 15233

NO-LIEN AGREEMENT

“TO BE COMPLETED ONLY BY AWARDEE”

Bid 1138

Made the _____ day of _____, 20____ between _____
_____ Pittsburgh, Pennsylvania Contractor and Community College of Allegheny County,
Pittsburgh, Pennsylvania, Owner.

Whereas, by separate written contract dated and executed the day and year first above written. The Owner and Contractor have entered into a No-Lien Contract (herein described for convenience as the Contract) to furnish all labor, materials, supplies, tools, and equipment necessary to complete the Contract in accordance with the specifications prepared by the Owner, and the provisions on the Contract between the Owner and Contractor, as more particularly recited therein.

NOW, THEREFORE, in consideration of the execution of said Contract for the purchases of and delivery on the premises of the owner and terms and conditions thereof, the Contractor covenants and agrees as follows:

1. The contractor covenants and agrees that no mechanics' claims or liens shall be entered or filed by the Contractor or by any subcontractor or materialsman or by an other person against the building or property of the Owner described more particularly hereinafter, for or on account of any work or labor done, materials, supplies, tools and equipment furnished in, upon, or about the building and property of the Owner described more particularly hereinafter.
2. Any and all right of lien is hereby waived and the Contractor, all subcontractors, all materialsmen, all persons supplying labor, and/or materials and all other persons shall look exclusively to and hold the Contractor and not the property liable for any sums due, however arising.
3. The property as to which this No-Lien Agreement is filed is located at Community College of Allegheny County, _____.

Block/Lot _____

IN WITNESS WHEREOF, the parties hereto, with the intent to be bound legally thereby have duly executed this No-Lien Agreement the day and year first above written.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY (OWNER)

CCAC - VICE PRESIDENT FOR FINANCE (revised 3/16/15)

(CONTRACTOR)

WITNESS

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE PITTSBURGH, PA 15233

INSURANCE REQUIREMENTS

FORM B

Indemnification. To the fullest extent permitted by law, Contractor shall defend, indemnify and hold harmless the Community College of Allegheny County (CCAC), its agents, officers, employees, and volunteers from and against all claims, damages, losses, and expenses (including but not limited to attorney fees and court costs) arising from the acts, errors, mistakes, omissions, work or service of Contractor, its agents, employees, or any tier of its subcontractors in the performance of this Contract. The amount and type of insurance coverage requirements of this Contract will in no way be construed as limiting the scope of indemnification in this Paragraph.

Insurance. Contractor shall maintain during the term of this Contract insurance policies described below issued by companies licensed in Pennsylvania with a current A.M. Best rating of A- or better. At the signing of this Contract, and prior to the commencement of any work, Contractor shall furnish the CCAC Purchasing Department with a **Certificate of Insurance** evidencing the required coverages, conditions, and limits required by this Contract at the following address: Community College of Allegheny County, Purchasing Department, 800 Allegheny Avenue, Pittsburgh, PA 15233.

The insurance policies, except Workers' Compensation and Professional Liability, shall be endorsed to name Community College of Allegheny County, its agents, officers, employees, and volunteers as Additional Insureds with the following language or its equivalent:

Community College of Allegheny County, its agents, officers, employees, and volunteers are hereby named as additional insureds as their interest may appear.

All such Certificates shall provide a 30-day notice of cancellation. Renewal Certificates must be provided for any policies that expire during the term of this Contract. Certificate must specify whether coverage is written on an Occurrence or a Claims Made Policy form.

Insurance coverage required under this Contract is:

- 1) **Commercial General Liability** insurance with a limit of not less than \$1,000,000 per occurrence for bodily injury, property damage, personal injury, products and completed operations, and blanket contractual coverage, including but not limited to the liability assumed under the indemnification provisions of this Contract.
- 2) **Automobile Liability** insurance with a combined single limit for bodily injury and property damage of not less than \$1,000,000 each occurrence with respect to Contractor's owned, hired, and non-owned vehicles.
- 3) **Workers' Compensation** insurance with limits statutorily required by any Federal or State law and **Employer's Liability** insurance of not less than \$100,000 for each accident, \$100,000 disease for each employee, and \$500,000 disease policy limit.
- 4) **Professional Liability** insurance (where applicable) covering acts, errors, mistakes, and omissions arising out of the work or services performed by the Contractor, or any person employed by the Contractor, with a limit of not less than \$1,000,000 each claim.

CCAC Boyce Campus
Egress Lighting Modifications
Monroeville, PA

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078443 JOINT FIRESTOPPING

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260500 COMMON WORK RESULTS FOR ELECTRICAL
260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
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260923 DIGITAL NETWORK LIGHTING CONTROLS
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DIVISION 27 -- COMMUNICATIONS

271300 COMMUNICATIONS CABLING

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SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

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END OF SECTION 012200

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions.
 - 2. Joints at exterior curtain-wall/floor intersections.
 - 3. Joints in smoke barriers.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
 - 1. Products manufactured by STI
 - 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Joints at Exterior Curtain-Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E2307.
 - 1. Products manufactured by STI
 - 2. F-Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.

- D. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 - 1. Products manufactured by STI.
 - 2. L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.
- E. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
 - 3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

END OF SECTION 078443

SECTION 260500 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. General administrative and procedural requirements.
 - 2. Electrical demolition.
 - 3. Cutting and patching for electrical construction.
 - 4. Touch-up Painting.
 - 5. Joint Sealers.

1.3 PARTIAL SCOPE

- A. This partial scope is intended to provide general project highlights – this partial scope is not comprehensive nor all inclusive. This contractor must visit the building and observe existing conditions – this contractor shall document and make owner aware of any condition which may affect his/her work. Failure to document and submit in writing to owner any condition which may affect contractors work does not excuse contractor from completing this installation. This contractor must review the entire document set prior to submitting his/ her bid.
- B. This project includes but is not limited to egress lighting circuit modifications. The installed system is a new Enlighted wireless control system. This project will involve intercepting and replacing lighting conductors. Project includes but not limited to programming of lighting fixtures in certain rooms; recircuiting egress fixtures; providing new fixtures (limited basis) with contractor provided Enlighted onboard control; removal and recircuiting of existing 3-way switches; removal and recircuiting of 2-way switches; providing Enlighted emergency interface relays (similar to Bodine transfer devices in functionality) and providing Bodine transfer devices. This project includes removal of ground shorts in several circuits (less than 10 is expected) and removal of back-feeds into the emergency system (primarily accomplished via the recircuiting as shown on drawings - EC shall verify all EM panels are not back fed). A partial commissioning of the lighting controls shall be provided by contractor with factory trained Enlighted representative; protecting and maintaining existing building wiring and acoustical ceilings – replacing any damaged ceiling tiles; integrating the lighting control system into the building management network.

- C. Maintaining existing raceways and wiring is a part of this project. This contractor shall be required to extend existing raceway systems and wiring in some rooms. A linear foot allotment is identified on the contract drawings. The exact locations where circuits are to be extended will be determined in the field during construction.
- D. The electrical contractor shall serve as the "prime" for the purposes of these documents. The electrical contractor shall remove ceiling tiles; provide penetrations as required; patch and paint upon substantial completion.

1.4 GENERAL STIPULATIONS

- A. The contractor shall procure all necessary permits to carry out their work. They shall also arrange for all tests required on any and all parts of their work by local authorities, paying all regular and proper charges for same. They shall also obtain all certificates of inspection and approval from all required authorities and the Underwriters. Underwriters' certificates in duplicate shall be furnished to the owner at the completion of the project. Also, the contractor shall furnish two copies of each intermediate Underwriters' inspection report to the Architect and the owner. All fees and permits required shall be satisfied and obtained by the contractor and the cost shall be included in the contract price.
- B. When the installation is reported in writing by the Contractor to be complete and ready for acceptance, tests and inspection shall be made by the Contractor in the presence of representatives of the Architect to ascertain whether it complies with the specifications and Contract, and upon its failure to do so, the Contractor shall at once remedy all defects and shortcomings, and any additional tests that may be required shall be entirely at the Contractor's expense.
- C. The Contractor shall have a managerial representative at each and every regularly scheduled job conference to receive the items that are furnished by owner, to inventory them and coordinate his work with the other trades.
- D. This Contractor shall be entirely responsible for all apparatus, equipment, and appurtenances furnished under this Contract in connection with the work, and special care shall be taken to protect all parts thereof in such a manner as may be necessary or as may be directed. Protection shall include covers, crating, sheds, or other means to prevent dirt, grit, plaster, or other foreign substances from entering the working parts of machinery or equipment. Special care shall be taken to keep all open ends of conduit and other equipment closed while in storage and during the course of installation. Where equipment must be stored outside the building, it shall be totally covered and secured with heavy waterproof tarps and kept dry at all times. Where equipment has been subjected to moisture, it shall be suitably dried out before placed in service. All apparatus, equipment, conduit and other appurtenances shall be stored in areas designated by the Architect.
- E. The Contractor shall be responsible for coordinating with all Utility Companies that will provide services to this job site. This Contractor shall communicate with each and every public utility company and incorporate into this project's scope of work all Utility requirements for this project. This shall include, but not be limited to, all working clearances, fees, materials, equipment, conduits, conductors, service charges, etc.

1.5 DEFINITIONS

- A. Approved Equal: The term “approved equal”, “approved”, “equal”, “equivalent”, etc. shall mean equal in all respects in the opinion of the Architect.
- B. As Required: The term "as required" refers to making final connections to and/or coordinating with the appropriate authorities regarding the installation of the indicated equipment.
- C. Contractor: The term "Contractor", "this Contractor" or "Electrical Contractor" when used in the Contract Documents refers to the Contractor responsible for all work specified in Division 26 and as indicated on the Electrical Drawings.
- D. Directed: Terms such as "directed," "requested," "authorized," "selected," and "permitted" when used separately without referencing any authority, shall mean directed by the Architect, requested by the Architect, and similar phrases.
- E. Disconnect: Disconnect electrical service to indicated items. Associated conduit and wire shall be disconnected and removed, complete, back to its source. Where electrical equipment (e.g. generator) is connected to radiator, fuel, and exhaust piping, intake and exhaust ductwork, etc., this Contractor shall disconnect and remove all associated appurtenances, complete, back to their source unless noted otherwise.
- F. Existing to Remain: Protect construction and/or indicated items to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.
- G. Finished/Unfinished Space: The term “finished space” shall mean areas where drywall is hung and installed with wall coverings and/or painted, floors are polished or coverings are installed on the floor, and the ceiling is plaster/gypsum board and/or suspended A.C.T. The term “unfinished space” refers to any area that does not meet the definition for a “finished space” as specified above. Mechanical rooms, electrical rooms, garages, etc. are typically considered “unfinished spaces”.
- H. Furnish: The term "furnish" when used separately, shall mean to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations by others.
- I. Indicated: The term "indicated", "shown," "noted," "scheduled," and "specified" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents.
- J. Install: The term "install" when used separately, shall mean to mount in place, connect and make operable. Installation operations at the Project site shall include, but not be limited to, the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

- K. Provide: The term "provide" when used in these specifications, shall mean to furnish and install, complete and ready for the intended use. See above definitions for additional requirements.
- L. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- M. Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
- N. Remove: Remove and legally dispose of items except those indicated to be reinstalled or salvaged or to remain the Owner's property as directed.
- O. Salvage (Turn Over to Owner): Items indicated to be salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- P. Subcontractor: The term "Subcontractor" when used in these Contract Documents refers to an experienced installer (i.e. manufacturer, vendor, etc.) whom has successfully completed a minimum of five (5) previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction. Any reference to, or letting of work contained in these Contract Documents to any Subcontractor does not relieve this Contractor of his/her responsibility for all work, material and equipment indicated in these Contract Documents.
- Q. Work: The term "work" refers to all labor and materials provided by the Contractor and/or Subcontractor to make a complete and operable system.

1.6 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and as indicated below.
 - 1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
 - 2. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.

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3. Do not submit Product Data on the following items and/or systems until compliance with requirements of the Contract Documents has been confirmed. See “Substitutions” article specified elsewhere in Part 1 for the Compliance Report requirements.

- B. If the Contractor submits a product of a manufacturer which appears as *a second or third name without corresponding catalog numbers and/or the manufacturer is not listed by name*, the submittal shall include a Compliance Report. See “Substitutions” article specified elsewhere in Part 1 for the Compliance Report requirements and additional substitution requirements.
- C. All drawings, etc., submitted for approval shall be marked with the name of the project and shall bear the stamp of approval of the Contractor as evidence that the material has been checked by the Contractor. Any drawings, etc., submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmission.
- D. Additional copies may be required by individual sections of these Specifications.
- E. None of the items throughout the electrical specifications which require a submission and/or review, shall be installed in the work or orders placed for same until final review has been given by the Architect.
- F. Submit product data for the following products:
 - 1. Lighting fixtures.
 - 2. Wireless control system.
 - 3. CAT 6 cable.
 - 4. Network POE switch.
 - 5. Wiremold raceway system.
 - 6. Capacitor, associated contactor and accessories.
 - 7. Wiring.
 - 8. Conduit.
 - 9. Disconnect switches.
 - 10. Circuit breakers.
 - 11. Junction boxes and other raceway accessories.
 - 12. Access panels and doors.
- G. Welder certificates, signed by Contractor, certifying that welders comply with requirements specified under "Quality Control" article of this Section.
- H. Selective Demolition
 - 1. Schedules indicating proposed methods and sequence of operations for selective demolition prior to commencement of Work. Include coordination for shut off of electrical service, and details for dust and noise control.
 - a. Coordinate sequencing with construction phasing and Owner occupancy as directed.
 - 2. Inventory of items removed and salvaged by the Contractor for the Owner for inclusion in the Operation and Maintenance Manuals.
 - 3. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

4. Record drawings at Project closeout according to Division 1 Section "Contract Closeout."
 - a. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.7 SUBSTITUTIONS

- A. General: In order to establish standards of quality and performance, all types of materials listed hereinafter by manufacturer's names and/or manufacturer's catalog number shall be provided as specified. If this Contractor desires to substitute an item, he/she shall comply with the following administrative and procedural requirements which are included in this Section to expand the requirements as defined by Part 1 paragraph "Related Documents".
- B. Substitutions will be permitted only on products specified with the phrase "or approved equal", "or as approved", "or equal", "or equivalent", etc. and the burden shall be upon the bidder to prove such equality. If the Contractor elects to prove such equality, he/she must request the Architect's approval in writing to substitute such item for the specified item, and shall submit supporting data, and samples if required, to permit a fair evaluation of the proposed substitution with respect to quality, serviceability and warranty.
 1. Samples: When requested, samples of items that the Contractor proposes to use as substitutions for the specified products/systems shall be submitted as follows.
 - a. A sample of both the specified item and the proposed substitute item shall be submitted simultaneously. The scheduling of the submission of such samples shall be as directed and shall in no way delay the progress of the Project.
 - b. Fixtures shall be submitted complete with lamps and a line cord ready for temporary operation.
 - c. The Architect will assume no responsibility whatsoever for any samples submitted.
- C. When the phrase "or approved equal", "or as approved", "or equal", "or equivalent", etc. appears and the Contractor desires to furnish equipment of a manufacturer other than that specified or intended, he/she shall include a complete specification of the substituted item, along with each submission copy of shop drawings, indicating the necessary modifications to the substituted product to satisfy the requirements of the Contract Documents.
 1. Compliance Report: Along with each submission copy of the product data and/or shop drawing, the manufacturer shall indicate the necessary modifications to the product and/or system to satisfy the requirements of the Contract Documents. Each paragraph including all subparagraphs shall bear the same paragraph number as the contract specification so that a close comparison can be made to the manufacturer specified herein by catalog number(s).

2. Each paragraph for the substituted product/system shall be identified as follows:
 - a. Comply: The term “comply” shall only be used when the product/system indicated by the paragraph is completely equal in all respects to the type of material used, functionality, programmability, size, accessories to be provided, future capabilities, mounting, etc. to that which was specified. Anything less is not to be considered as complying and shall not be indicated as “Comply”.
 - b. Exception: The term “exception” shall be used when the product/system indicated by the paragraph does not meet the definition of “comply” as indicated above. The manufacturer shall provide a brief, clear and non-technical description of why the product/system does not meet the requirements of the specification and why it is not necessary to provide the specified materials, components, features, etc.
 - c. Deviate: The term “deviate” shall be used when the product/system indicated in the paragraph does not fully comply but the manufacturer is willing to provide all the necessary materials, components, features, accessories, future capabilities, etc. to meet the intent of the Contract Documents as determined by the Architect. The manufacturer shall provide a brief, clear and non-technical description of what additional items are to be provided and how these items affect the product/system.
3. Compliance report may be submitted prior to the submission of the substituted product data and/or shop drawings but the Architect reserves the right to request that certain product data, shop drawings, wiring diagrams, certificates, etc. be included as requested.

D. All costs involved in changes in the building, to the equipment, to the arrangement of equipment, or to the work performed or to be performed under other sections of the specifications, due to the substitution of equipment in lieu of that shown on the drawings or specified, shall be borne by the Contractor making such substitutions, and shall include, but not necessarily be limited to, costs or fees in connection with resubmission of drawings for approval, if required, by the Authority Having Jurisdiction, local authorities or insuring agencies having jurisdiction over the work.

1.8 REGULATIONS

- A. All laws, ordinances, rules and regulations of public bodies bearing on the conduct of the work are hereby incorporated and made a part of these specifications.
 1. Americans with Disabilities Act.
 2. Pennsylvania Uniform Construction Code / International Building Code to include the IECC.
 3. City and Local Codes.
 4. National Fire Protection Association (NFPA), i.e. National Electric Code - NFPA 70, Electrical Safety in the Workplace – NFPA 70E, National Fire Alarm Code – NFPA 72, Life Safety Code - NFPA 101 and Emergency and Standby Power Systems – NFPA 110.
 5. National Electrical Safety Code - ANSI C2.
 6. Owner's insuring agency.
- B. The Contractor shall comply with all rules, regulations and recommendations of any public utility serving this project.

- C. The entire electrical system shall be installed in accordance with the latest edition of the National Electrical Code, approved by the governmental body having jurisdiction, including amendments thereto.

1.9 DRAWINGS AND SPECIFICATIONS

- A. The drawings are generally diagrammatic and indicative of the work to be installed. Exact locations of equipment and points of termination shall be reviewed with the Architect. Should it be found that any system or equipment cannot be installed as shown on the drawings, the Architect shall be consulted before installing or making changes to the layout.
- B. The drawings and specifications are intended to function as a common set of documents. Anything shown on the drawings but not in the specifications, or mentioned in the specifications and not shown on the drawings, shall be equally binding as if both noted on the drawings and called for in the specifications.
- C. No measurement of a drawing by scale shall be used as a working dimension. Working measurements shall be taken from figured dimensions and through cooperation with all other Contractors.
- D. This Contractor shall carefully examine the Architectural, Structural, HVAC, Plumbing and Miscellaneous Contract Drawings and Specifications. If any discrepancies occur between the drawings or between the drawings and specifications, the discrepancies shall be reported to the Architect in writing and obtain written instructions as to the manner in which to proceed. No departures from the Contract Drawings shall be made without prior written instructions from the Architect.
- E. All items of labor, material and equipment not specified in detail or shown on the drawings but incidental to or necessary for the complete and proper installation and proper operation of the several branches of the work described herein or reasonably implied in connection therewith, shall be furnished as if called for in detail by the specifications or drawings.

1.10 FAMILIARITY WITH CONTRACT REQUIREMENTS

- A. It is the responsibility of the Contractor, prior to submitting a bid on this Project, to satisfy himself as to the nature and location of the work, the conformation of the ground, soil characteristics, the character, quality and quantity of the materials which will be required, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and of all other matters which can in any way affect the work under this Contract.
- B. Failure to make an on-site inspection prior to submitting a bid, or failure to comply with any or all of the above requirements will not relieve this Contractor from the responsibilities of properly estimating the requirements or costs of successful completion of the work nor from the responsibility for the faithful performance of the provisions of this Contract.

- C. The Electrical Contractor shall confer with all other Contractors and shall apply for detailed and specific information regarding the location of all equipment as the final location may differ from that indicated on the drawings. Outlets, equipment or wiring improperly placed because of the Electrical Contractor's failure to obtain this information shall be relocated and reinstalled by the Electrical Contractor without additional expense to the Owner.

1.11 COORDINATION DRAWINGS:

- A. Coordination drawings shall be initiated by the contractor responsible for the installation. This contractor shall indicate, on the architectural floor plans, equipment locations and dimensions drawn to scale, taking into consideration and incorporating proper clearances. All discrepancies and conflicts with the architectural layout of the building shall be noted on the coordination drawings. The contractor who initiated the coordination drawings shall submit them for review. Coordination and installation of any equipment not indicated on the coordination drawing shall be the responsibility of the contractor responsible for that equipment. Any modifications required by any contractor for equipment to be installed that is not shown on the coordination drawing shall be the responsibility of the contractor who failed to indicate that equipment.
 - 1. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
 - 4. Equipment and accessory service connections and support details.
 - 5. Fire-rated wall and floor penetrations.
 - 7. Sizes and location of required concrete pads and bases.
 - 8. Scheduling, sequencing, movement, and positioning of large equipment into building during construction.
 - 9. Reflected ceiling plans to coordinate and integrate installation of air outlets and inlets, light fixtures, communication system components, sprinklers, and other ceiling-mounted items.
- B. Electronic Files: Provide electronic files of all shop drawings and coordination drawings in AutoCAD 2018 format or later version. Also provide drawings in a PDF format.

1.12 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements as defined by Part 1 paragraph "Related Documents" and the following:
- B. Markup Procedure: During construction, maintain a set of blue or black line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
 - 1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
 - a. Revisions to details shown on the Drawings.
 - b. Locations and depths of all underground utilities and underslab conduits.

- c. Locations of interior conduits larger than 2" diameter not installed underslab.
 - d. Locations of all feeder conduits.
 - e. Revisions to Branch and Feeder Circuits: Record circuit numbers and associated panelboard space numbers for all existing, new, or relocated electrical appurtenances, mechanical equipment, owner furnished equipment, etc. that required power or reconnection of existing electrical services. Each circuit number shall be shown with a homerun coming off the equipment it serves. Circuit numbers indicated on the record drawings shall match the new or updated panelboard indexes.
 - f. Actual installed equipment locations.
 - g. Changes made by change order, Architect's written orders, and Owner requested.
2. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 4. Note Construction alternate numbers, change order numbers, and similar identification.
 5. Accurately record information in an understandable drawing technique.
 6. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
 7. At time of Substantial Completion, submit record drawings to the Architect for the Owner's records. Organize into sets and bind and label sets for the Owner's continued use.
- C. Copies and Distribution: After completing the record drawings, print/copy 3 blue or black line prints of each drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets.
1. Organize and bind original marked up set of prints that were maintained during the construction period in the same manner.
 2. Submit the marked-up record set and a minimum 3 copy sets to the Architect for the Owner's records. Should more copies be requested by the Architect, they shall be provided at no cost to the Owner.

1.13 OPERATION MAINTENANCE MANUALS

- A. General: Prepare maintenance manuals in accordance with Part 1 paragraph "Related Documents" and the following:
- B. Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.

1. Binders: For each manual, provide heavy duty, commercial quality, 3 ring, vinyl covered, loose leaf binders, in thickness necessary to accommodate contents, sized to receive 8 1/2 by 11 inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
 - a. Where two (2) or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Identify each binder on front and spine, with the printed title "ELECTRICAL OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
2. Dividers: Provide heavy paper dividers with celluloid covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the Section on each divider.
3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
4. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8 1/2 by 11 inch, 20 lb/sq. ft. white bond paper.
5. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
 - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
 - b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

C. Manual Content

1. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
 - a. General system or equipment description.
 - b. Design factors and assumptions.
 - c. Copies of all approved Shop Drawings and Product Data, including products/systems installed during construction by change order, etc.
 - d. System or equipment identification, including:
 - 1) Name of manufacturer.
 - 2) Model number.

- 3) Serial number of each component.
 - e. Operating instructions.
 - f. Emergency instructions.
 - g. Wiring diagrams.
 - h. Inspection and test procedures.
 - i. Inspection reports and certificates.
 - j. Maintenance procedures and schedules.
 - k. Precautions against improper use and maintenance.
 - l. Copies of warranties.
 - m. Repair instructions including spare parts listing.
 - n. Sources of required maintenance materials and related services.
 - o. Manual index.
2. Organize each manual into separate Sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of Product Data, supplemented by Drawings and written text; and copies of each warranty, bond, and service contract issued.
- a. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - 1) Subject matter covered by the manual.
 - 2) Name and address of the Project.
 - 3) Date of submittal.
 - 4) Name, address, and telephone number of the Contractor.
 - 5) Name and address of the Architect.
 - 6) Cross reference to related systems in other operation and maintenance manuals.
 - b. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - 1) Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 - c. General Information: Provide a general information Section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the Subcontractor or Manufacturer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.

- d. **Product Data:** Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
- e. **Written Text:** Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
- f. **Drawings:** Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
 - 1) Do not use original project record documents as part of operation and maintenance manuals.
- g. **Warranties, Bonds, and Service Contracts:** Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.
- h. **Approval letters from the following:**
 - 1) Local authority having jurisdiction
 - 2) Inspection agency
 - 3) Field representative for specific systems, e.g. fire alarm, signal/communication, intrusion detection, VFD, etc.

D. Electrical Maintenance Manual

1. **Equipment and Systems:** Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
 - a. **Description:** Provide a complete description of each unit and related component parts, including the following:
 - 1) Equipment or system function.
 - 2) Operating characteristics.
 - 3) Limiting conditions.
 - 4) Performance curves.
 - 5) Engineering data and tests.
 - 6) Complete nomenclature and number of replacement parts.

- b. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
 - 1) Printed operation and maintenance instructions.
 - 2) Assembly drawings and diagrams required for maintenance.
 - 3) List of items recommended to be stocked as spare parts.
- c. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
 - 1) Routine operations.
 - 2) Troubleshooting guide.
 - 3) Disassembly, repair, and reassembly.
 - 4) Alignment, adjusting, and checking.
- d. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
 - 1) Startup procedures.
 - 2) Equipment or system break in.
 - 3) Routine and normal operating instructions.
 - 4) Regulation and control procedures.
 - 5) Instructions on stopping.
 - 6) Shutdown and emergency instructions.
 - 7) Summer and winter operating instructions.
 - 8) Required sequences for electric or electronic systems.
 - 9) Special operating instructions.
- e. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
- f. Controls: Provide a description of the sequence of operation and as installed control diagrams by the control manufacturer for systems requiring controls.
- g. Circuit Directories: For electric and electronic systems, provide complete typewritten circuit directories of panelboards, including the following:
 - 1) Electric service.
 - 2) Controls.
 - 3) Communication.

E. In addition to the number of maintenance manuals referenced in the "Related Documents" paragraph, prepare one (1) additional copy to be kept by the Engineer.

1.14 QUALITY ASSURANCE

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

- B. Labels and Listings: "Labels and Listings" for appliances and equipment provided meet the requirements of the Underwriters Laboratories, Inc. (UL), Electrical Testing Laboratories (ETL) and other standards organizations.
- C. Seismic Requirements: Provide equipment anchoring and support to resist shear and overturning moments.
- D. Current Models:
 - 1. Manufactured items furnished shall be the current, cataloged product of the manufacturer.
 - 2. Replacement parts shall be available.
 - 3. There shall be a permanent service organization maintained or trained by the manufacturer to provide satisfactory service.
- E. Experience: Manufactured items shall have been installed and used, without modification, renovation or repair, on other projects for not less than three years prior to the date of bid opening for this project.
- F. All work shall be installed in a first class, neat and workmanlike manner by mechanics skilled in the trade involved. The quality of workmanship shall be subject to the approval of the Architect. Any work found by the Architect to be of inferior quality and/or workmanship shall be replaced and/or reworked until approval of the Architect is obtained. Any cost involved in obtaining said approval shall be the responsibility of the Electrical Contractor.

1.15 CONTINUITY OF SERVICE

- A. The Contractor shall maintain electrical service to the Existing Buildings during the course of construction. Temporary equipment, switches, cable and whatever else necessary shall be provided as required to maintain electric service. Rules and regulations of local, state and federal authorities respecting safety provisions shall be observed. The Contractor shall use all precautions so as not to endanger the lives of the building occupants or the public. The Contractor shall furnish and install a temporary service should it be required and remove same after need is satisfied. All charges and costs shall be included in the Electrical Contract.
- B. When it becomes necessary to temporarily interrupt electric service to any portion of the buildings, the Contractor shall notify the Architect and the Owner in writing at least seven days in advance to enable necessary arrangements to be made. No interruptions will be permitted without the expressed written permission of the Owner.
- C. The existing fire alarm system shall be fully maintained in service during the execution of work under this Contract. The Contractor shall furnish and install, and later remove any temporary equipment, wiring or other appurtenances necessary to provide the continuity of service for the system.

1.16 INSTRUCTIONS TO OPERATING PERSONNEL

- A. The Contractor shall furnish the services of a person, or persons, approved by the Architect and thoroughly familiar with the completed installation to instruct the Owner's Operating Personnel in the proper operation of the electrical systems and the proper care of all equipment and apparatus included under this Contract. These services shall be furnished for a minimum of two 8-hour days.
- B. During the instruction period, the Contractor and his approved qualified personnel shall demonstrate to the Owner, in the presence of the Architect's representative, the complete operation of the various systems installed under this Contract. Manufacturers' certificates of tests and performance shall be delivered to the Architect and the Owner as hereinafter specified with the various systems or equipment.
- C. When instructions are provided under this Contract, the Contractor shall have in his possession three copies of an identifying letter which shall list the names of the Contractor's qualified instruction personnel including manufacturer's representatives and subcontractors that will be giving the instructions. Likewise on this same letter, spaces shall be provided for the Owner's personnel who will receive the instructions. After instructions have been given and received for each system, the Contractor's representatives and subcontractors shall sign and date the letter, and the Owner's personnel shall also sign and date the letter acknowledging that they have received adequate instructions for operating and maintaining the systems and equipment. One signed copy shall be delivered to the Owner, one copy to the Architect, and one copy shall be retained by the Contractor.
- D. In addition to the verbal instructions outlined above, the Contractor and his manufacturers' representatives and subcontractors shall furnish written basic instructions indicating the proper operation of each system and associated equipment. Each manufacturer shall also submit a brochure on his equipment, including instructions on operation, lubrication, recommended spare parts, and instructions on preventative, routine, and breakdown maintenance.
- E. The Contractor shall combine the written instructions and the manufacturers' equipment brochures in complete volumes with hard back binders which shall be turned over to the Owner before final acceptance of the Contract work. Unless otherwise directed, three (3) copies of the volumes shall be furnished.
- F. All brochures and formats must be approved by the Architect.
- G. It is the intent that this entire system, with its complement of equipment and auxiliary equipment, operate properly in accordance with the design concept and functional intent. It is also the intent that the Owner be given complete instructions for the proper operation and maintenance of the entire system.

1.17 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.18 GUARANTEE/WARRANTY

- A. Written one (1) year full warranty guarantees shall be submitted for the entire electrical installation installed under this project (except for lamps). Where manufacturer's standard guarantee provides for a longer period, the longer period shall apply.
- B. Where defects in the material, equipment and/or workmanship become evident within this guarantee period, the Contractor shall be responsible for replacing such material and equipment with the approved type of new items; and/or correcting the defective workmanship without any costs to the Owner.

1.19 SEQUENCING, SCHEDULING AND COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."
- E. Arrange selective demolition so as not to interfere with Owner's on site operations.
- F. Coordinate electrical equipment installation with other building components.
- G. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations.

- H. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning prior to closing in the building.
- I. Coordinate connecting electrical service to components furnished under other Sections.
- J. Notify the Architect at least 5 days prior to commencing demolition operations.
- K. Perform selective demolition in phases – coordinate with mechanical contractor and owner.

PART 2 - PRODUCTS

2.1 CONCRETE BASES

- A. Concrete Forms and Reinforcement Materials: Provide bases for all equipment furnished under this contract.
- B. Concrete: 4000-psi, 28-day compressive strength.

2.2 SLEEVE SEALS

- A. The Contractor shall furnish and install modular wall seals where conduits pass through exterior walls. Seals shall be "Link-Seal" modular wall and casing seal, as manufactured by Thunderline Corporation, or approved equal. Sleeves shall be of appropriate size for the size of conduits to be installed, in accordance with the manufacturer's recommendations. The seal shall be composed of identical solid rubber links, bolted and interlocked to form a belt. As belt bolts are tightened, rubber links form an automatic protective seal. The seal shall be rated for 40 feet of head or 20 psig. Seal shall be capable of absorbing shock transmitted either from changes in internal pipe pressures or from ground disturbances. Seal shall be made of synthetic rubber material especially compounded to resist aging, ozone, sunlight, water, and chemical action, and shall provide low temperature flexibility and resistance to high temperature environments. Bolts and metal parts shall be of carbon steel and zinc phosphate plated to resist corrosion. The seal shall be capable of providing air tightness in above ground installations and hydrostatic sealing in below grade installations. Seal shall be capable of maintaining cathodic protection with Delrin plastic pressure plates. Install seals in accordance with Manufacturer's Bulletin LS-104. Brush underground metal parts with a good grade of mastic before backfill.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 MISCELLANEOUS METALS

- A. Steel plates, shapes, bars, and bar grating: ASTM A 36.
- B. Cold Formed Steel Tubing: ASTM A 500.
- C. Hot Rolled Steel Tubing: ASTM A 501.
- D. Steel Pipe: ASTM A 53, Schedule 40, welded.
- E. Fasteners: Zinc coated, type, grade, and class as required.

2.5 MISCELLANEOUS LUMBER

- A. Framing Materials: Standard Grade, light framing size lumber of any species. Number 3 Common or Standard Grade boards complying with WCLIB or AWPB rules, or Number 3 boards complying with SPIB rules. Lumber shall be preservative treated in accordance with AWPB LP 2, and kiln dried to a moisture content of not more than 19 percent.
- B. Construction Panels: Plywood panels; APA C D PLUGGED INT, with exterior glue; thickness as indicated, or if not indicated, not less than 15/32 inches.

2.6 TOUCHUP PAINT

- A. For Equipment: Provided by equipment manufacturer and selected to match equipment finish.
- B. For Nonequipment Surfaces: Matching type and color of undamaged, existing adjacent finish.
- C. For Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

2.7 JOINT SEALERS

- A. General: Joint sealers, joint fillers, and other related materials compatible with each other and with joint substrates under conditions of service and application.
- B. Colors: As selected by the Architect from manufacturer's standard colors.
- C. Elastomeric Joint Sealers: Provide the following types:
 - 1. One-part, nonacid-curing, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non-traffic areas for masonry, glass, aluminum, and other substrates recommended by the sealant manufacturer.
 - 2. One-part, mildew-resistant, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non-traffic areas for glass, aluminum, and nonporous joint substrates; formulated with fungicide; intended for sealing interior joints with nonporous substrates; and subject to in-service exposure to conditions of high humidity and temperature extremes.

3. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. One-Part, Nonacid-Curing, Silicone Sealant:
 - 1) "Chem-Calk N-Cure 2000," Bostic Construction Products Div.
 - 2) "Dow Corning 790," Dow Corning Corp.
 - 3) "Silglaze N SCS 2501," General Electric Co.
 - 4) "Silpruf SCS 2000," General Electric Co.
 - b. One-Part, Mildew-Resistant, Silicone Sealant:
 - 1) "Dow Corning 786," Dow Corning Corp.
 - 2) "SCS 1702 Sanitary," General Electric Co.
 - 3) "863 #345 White," Pecora Corp.
 - 4) "Rhodorsil 6B White," Rhone-Poulenc, Inc.
 - 5) "Proglaze White," Tremco Corp.
 - 6) "OmniPlus," Sonneborn Building Products Div.
- D. Acrylic-Emulsion Sealants: One-part, nonsag, mildew-resistant, paintable complying with ASTM C 834 recommended for exposed applications on interior and protected exterior locations involving joint movement of not more than plus or minus 5 percent.
 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. "Chem-Calk 600," Bostik Construction Products Div.
 - b. "AC-20," Pecora Corp.
 - c. "Sonolac," Sonneborn Building Products Div.
 - d. "Tremco Acrylic Latex 834," Tremco, Inc.
- E. Fire-Resistant Joint Sealers: Two-part, foamed-in-place, silicone sealant formulated for use in through-penetration fire-stopping around cables, conduit, pipes, and duct penetrations through fire-rated walls and floors. Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with ASTM E 814, by Underwriters' Laboratories, Inc., or other testing and inspection agency acceptable to authorities having jurisdiction.
 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. "Dow Corning Fire Stop Foam," Dow Corning Corp.
 - b. "Pensil 851," General Electric Co.

2.8 REPAIR MATERIALS

- A. Use repair materials identical to existing materials. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. This Contractor shall expedite the work for a specific area, section or part of the Project to make provision for, or protect equipment or to permit the installation of another part of the work.
- B. All materials and equipment supplied by this Contractor shall be new, of the best of their respective kinds, without imperfections and blemishes, and shall be protected from the elements prior to installation.
- C. All conduits, wire, cable, wiring devices and equipment shall be installed in such a manner as to preserve access to any existing equipment or to any new equipment installed under this specification or under other specifications or contracts for this Project and with sufficient space provided for proper operation and maintenance.
- D. The drawings are generally indicative of the work to be installed but do not indicate all bends, fittings, boxes, etc., which may be required. The Contractor shall carefully investigate the structural and furnish conditions affecting his work, arrange his work accordingly, and furnish such fittings as may be required to meet such conditions.
- E. This Contractor shall coordinate his work with other trades so that all work may be installed in the most direct manner and so that interference between piping, ducts, equipment, architectural or structural features will be avoided. In cases of interference, conflicts, or fouling results, the Architect shall decide which work is to be relocated, regardless of which was installed first. Such relocation shall be at no additional expense to the Owner.
- F. All materials and equipment installed by the Contractor shall be firmly supported and secured to the building structure/construction as required.
- G. Scaffolding with ladders shall be furnished and erected, where required for the proper installation of wiring, equipment and fixtures.

3.2 ROUGH-IN

- A. Verify final locations for rough ins with field measurements and with the requirements of the actual equipment to be connected.

- B. Refer to equipment specifications in other Specification Divisions and approved product data and shop drawings for rough-in requirements.

3.3 ELECTRICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate electrical systems, equipment, and materials installation with other building components.
2. Verify all dimensions by field measurements.
3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
7. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
8. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
9. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
10. Install access panel or doors where units are concealed behind finished surfaces.
11. Install systems, materials, and equipment giving right of way priority to systems required to be installed at a specified slope.

- B. Performance of Equipment

1. All materials, equipment and appurtenances of any kind, shown on the drawings, hereinafter specified or required for the completion of the Project in accordance with the intent of these specifications, shall be completely satisfactory and acceptable in operation, performance, and capacity. No approval either in written or verbal of any drawings, descriptive data, or samples of such material, equipment and/or appurtenances shall relieve this Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the Project.

2. Any material, equipment or appurtenances, the operation, capacity or performance of which does not comply with the drawings and/or specification requirements or which is not new or which is damaged prior to acceptance by the Owner will be held to be defective material and shall be removed and replaced with the proper acceptable materials, equipment and/or appurtenances or put in proper acceptable working order, satisfactory to the Architect with no additional expense to the Owner.
3. All details of the installation of all equipment shall be electrically and mechanically correct. All equipment shall operate without objectional noise or vibration should be produced and transmitted to occupied portions of the building by apparatus, conduit or other parts of a system, any corrections to eliminate noise and vibration shall be at no expense to the Owner.

3.4 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Part 1 paragraph "Related Documents." In addition to the requirements referenced in the "Related Documents" paragraph, the following requirements apply:
 1. Perform cutting, fitting, and patching of electrical equipment and materials required to:
 - a. Uncover Work to provide for installation of ill timed Work.
 - b. Remove and replace defective Work.
 - c. Remove and replace Work not conforming to requirements of the Contract Documents.
 - d. Install equipment and materials in existing structures.
 - e. Upon written instructions from the Architect, uncover and restore Work to provide for Architect observation of concealed Work.
 2. Cut, remove, and legally dispose of selected electrical equipment, components, and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new Work.
 3. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
 4. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
 5. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
 6. Patch existing finished surfaces and building components using new materials matching existing materials and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.

B. Cutting, Patching, and Finishing (Existing Building)

1. Electrical Contractor shall be responsible for all cutting, patching, and finishing of existing construction for the proper installation of all electrical equipment and materials to be installed in the existing portion of this project. This will also be required for the removal of the existing equipment and materials. All cutting shall be kept to an absolute minimum consistent with the requirements of the project. Cutting, patching and finishing shall be done by workmen skilled in this type of work. All patching shall be done utilizing materials of the same quality and texture as the adjacent undisturbed areas perfectly and to the satisfaction of the Architect.
 - a. Cutting: Cut and remove existing construction only to the extent required by new Work and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
 - 1) Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2) Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3) Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.
 - 4) Maintain adequate ventilation when using cutting torches.
 - 5) Cut concrete and masonry at junctures with construction to remain, using power driven masonry saw or hand tools; do not use power driven impact tools.
 - b. Patching: Return elements of construction and surfaces to remain to condition existing before start of cutting operations.
 - c. Painting
 - 1) Painting of the final finished areas will be by the Prime Contractor. If no Prime Contractor is assigned to this project, the E.C. will provide touch up painting to architectural finishes.
 - 2) Where cutting and patching occurs in areas that the General Contractor does not have any work and/or the General Contractor is not required to finish the wall and/or ceiling that was affected by this Contractor's work, the Electrical Contractor shall paint the affected surface from "natural" break to "natural" break as directed by the Architect. When other trades other than the General Contractor damage the same wall and/or ceiling, the Electrical Contractor shall coordinate his painting responsibilities with the other trades before proceeding with any work in that area.

- 3) All surfaces to be painted shall receive an undercoat 24 hours before the final coat is applied. Undercoats which show lumps or rough areas shall be smoothed with fine sandpaper or steel wool and dusted of before the final coat is applied. Final coat shall be solid, even color, free of lumps, drops, sags, run brush marks, laps, or other defects, finished to a line where they adjoin other colors or unpainted surfaces.
 - 4) Drop cloths shall be used to protect floors and all other work from damage. Any covering temporarily removed from any part of the work or finish shall be promptly replaced and any damage from neglect to protect all surfaces shall be at the Contractor's expense.
 - 5) Paint color shall match adjoining surfaces as closely as possible and to the satisfaction of the Architect.
2. No cutting shall be done which may affect the building structurally or architecturally including building systems without first securing the approval of the Architect. Cutting shall be accomplished in such a manner as not to cause damage to the building or leave unsightly surfaces which cannot be concealed by plates, escutcheons, or other construction. Where unsightly conditions are caused, the Contractor shall be required, at his own expense, to repair the damaged areas.
 3. Cutting of the construction excessively or carelessly done shall be repaired by this Contractor to match the original work and to the satisfaction of the Architect who will make the final decision with respect to excessive or careless cutting work.
 4. This Contractor shall seal all openings he has made in plenum spaces, fire rated floors, ceilings or partitions after his work has been installed. The material used for sealing the openings shall have a fire rating equal to or greater than the rating of the floor, ceiling or partition material. Openings shall be suitably treated to prevent passage of stray light, air or sound.
 5. Where present equipment is removed and unused openings remain in walls, floors, partitions, etc., this Contractor shall properly patch all such openings. All patching and repairing shall be done by workmen skilled by this type or work and shall match present or new finishes.
 6. All holes or openings for the passage of conduit to be put in existing concrete shall be bored.
 7. Cutting, patching, and repairing of openings in the existing exterior walls and roof shall be by the General Contractor.

3.5 PROTECTION OF WORK, MATERIALS, AND EQUIPMENT

- A. This Contractor shall effectually protect at his own expense, all existing facilities and such of his new work, materials or equipment as is liable to injury during the construction period. All openings in to any part of the conduit system as well as all associated fixtures, equipment, etc. both before and after being set in place shall be securely covered or otherwise protected to prevent obstruction, damage, or injury due to carelessly or maliciously dropped tools or materials, grit, dirt moisture, water or any foreign matter. This Contractor shall be held responsible for all damage so done, until his work is fully accepted by the Architect. Conduit ends shall be covered with capped bushings.

- B. All surfaces, either finished or in preparation for finishing or finish material application, shall be protected against damage from painting, welding, cutting, burning, soldering or similar construction functions. The protection shall be accomplished by care in operations, covering and shielding. Special care shall be directed to exposed finished masonry, metal or wood surfaces and painted surfaces. Corrective measures required shall be accomplished by the trade which made the original installation and shall be at the expense of the Contractor causing the damage with no cost to the Owner.
- C. Any damage caused by neglect on the part of this Contractor or his representative, or by the elements due to neglect on the part of this Contractor or his representatives, either to the existing work, or to his work or to the work of any other Contractor, shall be repaired at his expense to the Architect's satisfaction.

3.6 CONCRETE BASES

- A. General: Install concrete pads and bases as indicated and as required for all new equipment under this contract.
- B. Forms and Reinforcing Materials
 - 1. Form concrete pads with framing lumber with form release compounds. Chamfer top edge and corners of pad. Anchor or key to floor slab.
 - 2. Install reinforcing bars where required, tied to frame, and place anchor bolts and sleeves to facilitate securing units.
- C. Mounting: Anchor electrical equipment and other system components on concrete housekeeping bases. Provide anchorage according to manufacturer's written instructions, unless otherwise indicated.
 - 1. Concrete Pad: Housekeeping bases shall be 4" high with 1" chamfer edges minimum and shall extend 4" beyond the edge of the electrical equipment on all accessible sides unless indicated otherwise. Coordinate size of equipment with actual unit size before proceeding with any formwork.
 - 2. Clearance: Maintain minimum workspace around components according to manufacturer's Shop Drawings and National Electrical Code.
- D. Concrete: Place concrete and allow to cure before installation of units. Use Portland cement that conforms to ASTM C 150, 4000 psi, 28-day compressive strength, and normal weight aggregate.

3.7 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve

seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements shall be U.L. listed systems.

3.9 CLEAN-UP

- A. Daily, and when directed by the Architect, the Electrical Contractor shall remove all waste and debris resulting from his work.
- B. Upon completion of his work and when directed by the Architect, the Electrical Contractor shall remove all dirt, foreign materials, stains and fingerprints from all equipment, fixtures, panels, plates, etc., installed under this contract. Internal areas of all equipment must be cleaned of all construction dust etc., prior to pre-final and/or final inspection.
 - 1. Clean paint, varnish spots and stains caused by finishing materials used by this Contractor from all walls, floors, trim, glass, hardware, fixtures, masonry or any other surface that is damaged by this Contractor's work.
 - 2. Do not use solvents that would remove or damage the finish of the finish hardware or other factory-finished materials. If damage occurs, the affected materials shall be returned to the factory for refinishing at not expense to the Owner.
 - 3. Repair all finishes damaged by this Contractor in areas that the General Contractor does not have any work and/or the General Contractor is not required to finish the space that was affected by this Contractor's work and leave all work clean and perfect at completion.

END OF SECTION 260500

SECTION 260519 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.
- B. Related Sections include the following:

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports: Indicate and interpret test results for compliance with performance requirements.

1.4 QUALITY ASSURANCE

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

1.5 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- B. Coordinate layout and installation of cables with other installations.
- C. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Architect.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Houston Wire and Cable
 2. American Insulated Wire Corp.; a Leviton Company.
 3. BICC Brand-Rex Company.
 4. Senator Wire & Cable Company.
 5. Southwire Company.
 6. Carol Cable Co., Inc.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.
- D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC and mineral-insulated, Type MI with ground wire.
- E. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Wire and Insulation Applications" Article.
- F. Conductor Material: Copper.
- G. Stranding: Conductors No. 10 and smaller, except where herein specified otherwise, shall be solid, and conductors No. 8 and larger shall be stranded.

2.2 METAL-CLAD CABLE

- A. Metal-Clad Cable (Type MC) may be installed in concealed locations for branch circuits of 30 amperes or less. Type MC cable shall be a galvanized sheathed assembly of one or more 600 volt, 90 degree C., copper conductors, each insulated and enclosed in a metallic sheath of interlocking corrugated tubes and shall comply with Article 334 and also applicable provisions of Article 300 of the National Electrical Code. Type MC cable shall be provided with an integral insulated ground conductor and shall be as manufactured by Thomas and Betts, or approved equal.
- B. Type MC cable shall be installed in compliance with the aforementioned Articles and shall be supported and secured at intervals not to exceed six feet. Support wires utilized for suspended ceiling or the suspended ceiling grid system shall not be utilized as the support for this cable. Type MC cable which must be installed exposed to view, in such areas as Mechanical and Electrical Equipment Rooms, shall be installed within rigid steel conduit, intermediate metal conduit, or electrical metallic tubing. Generally, this project has exposed to view work areas.

2.3 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amp Incorporated.
 - 2. O-Z/Gedney; EGS Electrical Group LLC.
 - 3. 3M; Electrical Products Division.
 - 4. Square D Co.; Anderson.
- C. Fittings utilized for the connection of Type MC cable to electrical boxes, cabinets, or other equipment shall be identified for use with Type MC cable and shall be of the type to provide effective bonding between the metallic sheath and such boxes, cabinets, and other equipment and shall be UL and CSA listed. Fittings shall be Thomas and Betts Catalog No. 2-050-008-B, or approved equal. Fittings and supports for Type MC cable shall comply with NEMA FB1 Standard Publication titled "Fittings and Supports for Conduit and Cable Assemblies" and shall be approved by the Engineer prior to installation.
- D. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements and as specified in Part 3 "Wire and Insulation Applications" Article.

2.4 LUGS AND CONNECTORS

- A. The Contractor shall furnish and install all necessary lugs and connectors of proper size and type as required by the work under these specifications. Lugs and connectors shall be installed in strict accordance with the cable and lug manufacturer's recommendations. Lugs and connectors must be suitable, marked and UL listed for the size, type of cable, bus, bolts, etc., connected. All connections shall be hydraulic crimp-type and made tight and solid. Each lug shall have a double lug connection (shall accommodate two bolts) and be crimped on 6 sides.

2.5 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRE AND INSULATION APPLICATIONS

- A. Underground Feeders and Branch Circuits: Type XHHW 2, in raceway.
- B. Feeders: Type THHN/THWN, in raceway.
- C. Branch Circuits: Type THHN/THWN, in raceway.
- D. Concealed Branch Circuits: Type MC Cable.
- E. Exposed Branch Circuits: Type THHN/THWN, in raceway.
- F. Fire Alarm Circuits: Type THHN/THWN, in raceway.
- G. Class 1 Control Circuits: Type THHN/THWN, in raceway.
- H. Class 2 Control Circuits: Type THHN/THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."
- B. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- C. Type MC cable shall be installed in compliance with the aforementioned Articles and shall be supported and secured at intervals not to exceed six feet. Support wires utilized for suspended ceiling, or the suspended ceiling grid system shall not be utilized as the support for this cable. Type MC cable shall not be installed exposed to view, in such areas as Mechanical and Electrical Equipment Rooms. These areas shall have circuits in conduit.
- D. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- E. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, which will not damage cables or raceway.
- F. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

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- G. Seal around cables penetrating fire-rated elements.
- H. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- I. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
- J. No conductors smaller than No. 12 AWG shall be used. No. 10 AWG conductors shall be installed for all 120 volt circuit runs greater than 100 ft. one way from panel to last outlet. No. 10 AWG conductors shall also be installed for all 277 volt circuit runs greater than 150 feet one way from panelboard to last outlet.
- K. Neutral conductors, shown or not shown, shall be installed for all single phase and for all three phase circuits in which a neutral is required for control circuit voltage.
- L. The conductor ampacities utilized for design purposes are based on 75 degrees C. conductor temperature rating. Where conductors are connected to or run within equipment which are U.L. listed for 60 degrees C., the conductor ampacities shall be based on 60 degrees C. The Contractor shall be responsible for providing the correct size conductors based upon ampacities and temperature ratings of equipment and conductors should any 60 degrees C. equipment be utilized.
- M. Conductors installed in high ambient locations such as electrical resistance heating equipment, in lighting fixture housings or channels, etc., shall be suitable for heat resisting service in accordance with Underwriters' requirements and NFPA 70.
- N. Each bundle or reel of conductors shall bear the maker's name and the Underwriters' label, together with the grade, size, length and manufacturing date. Similar information shall be included on the insulation jacket of the conductors. Secondary conductors shall comply with Federal Specifications JC-30A.
- O. All conductors underground, in or under slabs on grade and to outside outlets shall be continuous from switch to outlet. Conductors no smaller than No. 12 AWG shall be installed for light and power circuits.
- P. Conductors installed directly in Ducts, Plenums, or other spaces used for environmental air shall comply with Article 300.22 of NFPA 70.
- Q. The Contractor shall tag and identify each circuit and phase in all accessible locations such as outlet boxes, junction boxes, pull boxes, panelboards, disconnect switches, starters, equipment, etc. Tags or identification bands shall be nonmetallic, durable type. Paper or cardboard tags are not permitted.
- R. This Contractor shall verify prior to installation that there exists coordination between the overcurrent protective device and the respective circuit conductor sizes shown on the drawings. The Contractor is responsible for identifying discrepancies, between the overcurrent protective device and the respective circuit conductor sizes indicated, and notifying the Architect of such discrepancies prior to purchasing and/or installation of such materials.

- S. The conductor sizes are based on allowable current carrying capacities listed in the National Electrical Code for copper conductors.
- T. Aluminum conductors or copper-clad aluminum conductors will not be permitted.

3.4 CONNECTIONS

- A. Conductor Splices: No splices are permitted. Conductors shall be continuous between terminations.
- B. Use splice and tap connectors compatible with conductor material.
- C. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- E. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- F. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 DISTRIBUTION SYSTEM

- A. The electrical distribution system shall be installed, generally, as shown on the drawings. The drawings are diagrammatic and are not intended to show actual conduit locations and routing or exact equipment location. Such items are the responsibility of the Electrical Contractor.
- B. A separate conduit shall be provided for each set of mains, feeders, and branch circuits, except for single pole work on branch circuits where conductors may be grouped in accordance with the National Electrical Code; however, the maximum number of conductors installed in one conduit shall not exceed nine and the use of common neutral conductors is not permitted. More than nine conductors may be installed in one conduit for special systems and locations specifically shown on the drawings or where permitted by the Architect. Grouped conductors shall be derated by the Electrical Contractor in accordance with the requirements of the National Electrical Code Table 310.15(B)(2)(a). Main service conductors or feeder conductors shall not be grouped.
- C. Unless specifically indicated otherwise, all circuitry indicated on the drawings shall be interpreted as 3 #12 awg. conductors within a ¾" conduit. (One #12 awg. phase conductor, One #12 awg. neutral conductor and One #12 awg. ground conductor.) The use of a common neutral conductor in a multiple circuit arrangement is prohibited. Each single-phase circuit shall be provided with a separate neutral conductor. Sharing of a neutral conductor between two or more single phase circuits is not permitted.

3.6 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification, Section 7.3.1. Certify compliance with test parameters. Meggar tests are not required on low voltage conductors and cables.
 - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.
- B. The Contractor shall furnish and install all necessary materials and accessories to solidly ground all non-current carrying metal parts of the electrical system.
- C. The Contractor shall measure the resistance of the existing grounding system and supplement the existing to reach the required value specified.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
 - 1. Grounding arrangements and connections for separately derived systems.
 - 2. Grounding for sensitive electronic equipment.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
- D. Field quality-control test reports. Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
 - 1. Instructions for periodic testing and inspection of grounding features at test wells and grounding connections for separately derived systems based on NFPA 70B.

- a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
- b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING PRODUCT MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Anixter Brox., Inc
 2. ERICO, Inc.
 3. Ideal Industries, Inc.
 4. O-Z/Gedney Co.
 5. Thomas & Betts Corp.

2.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
 1. Comply with Division 26 Section "Conductors and Cables."
- B. Bare copper conductors shall not be used.
- C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.
- D. Braided Bonding Jumpers: Copper tape, braided No. 30 gage bare copper wire, terminated with copper ferrules.
- E. Bonding Strap Conductors/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, unless indicated otherwise.

2.3 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, heavy duty bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core.
 - 1. Size: 3/4" in diameter x 120" in length.

2.5 APPLICATIONS

- A. Conductors:
 - 1. Comply with Division 26 Section "Conductors and Cables."
- B. Underground Grounding Conductors: Install bare tinned copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 30 inches below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Welded connectors.

2.6 EQUIPMENT GROUNDING

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install a separate insulated equipment grounding conductors with all feeders and circuits. The use of the metallic raceway or cable sheath as the equipment grounding conductor is prohibited.
- C. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.
- D. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- E. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- F. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- G. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- H. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- I. Metal and Wood Poles Supporting Outdoor Lighting Fixtures: Install a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors and bond all metal parts on the pole, pole base, and fixture.

2.7 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- C. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- D. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install braided type bonding jumpers to bond across flexible duct connections to achieve continuity.
- E. Grounding for Steel Building Structure: Install a driven ground rod at base of each new corner column and at new intermediate exterior columns at distances not more than 60 feet apart.

2.8 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

- C. Equipment Grounding Conductor Terminations: Use pressure-type grounding lugs. All lugs used in the building system shall be rated copper only, copper-aluminum rated lugs shall not be acceptable.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

2.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- B. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified.
 - a. Perform tests by fall-of-potential method according to IEEE 81.
- C. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 5 ohms.
 - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohms.
- D. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.

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- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
 - 1. Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. Thomas & Betts Corporation.
 - e. Unistrut; Tyco International, Ltd.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 4. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron casting with hot-dip galvanized finish.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Powder-Actuated Fasteners should not be used in lightweight concrete or slabs less than 4 inches thick.
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) Fastenal Company
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Hilti Inc.
 - 3) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 4) Fastenal Company
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Zinc plated low carbon threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
- D. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

3.2 HANGERS AND PLATES

- A. All horizontal conduit or equipment within the building that is hung shall be hung from building construction with beam clamps or inserts in concrete, galvanized threaded extension rods, and approved hangers. Hangers and supports shall be arranged to distribute the weight of conduit and equipment uniformly on the structure. All conduits shall be securely fastened in place by means of galvanized malleable or galvanized stamped steel clamps, hanger rings, inserts or other approved galvanized supports.
- B. Spring steel clips may be used for supporting conduit. The spring steel clips, the arrangement of the spring steel clips and the method of fastening is subject to review by the Architect prior to installation.

- C. All necessary structural supports and inserts to hang all conduit and other miscellaneous equipment shall be provided by this Contractor. Steel plates and other supports shall be installed in the concrete construction. Hanger rods shall be securely attached to plates. Where cutting is required for the installation of hangers, conduit and supports, all openings must be neatly drilled by the Electrical Contractor. Punching or chipping of concrete will not be permitted. All necessary openings shall be drilled in a location and manner satisfactory to the Architect. All concrete damaged by the Electrical Contractor shall be patched, reinforced, or replaced as directed by the Architect. Location of all holes and openings shall clear reinforcing steel in floor and roof decks. The Electrical Contractor shall coordinate all work with the General Contractor and shall determine exact locations of all supports and openings.
- D. Furnish and install all required concrete inserts. Multiple inserts shall not be installed in a concrete structural slab less than 4" thick. For concrete structural slabs less than 4" thick, the Contractor shall furnish and install structural beams, angles, etc., built into general construction, as required. Multiple inserts may be installed only where approved by the Architect.
- E. The Contractor shall place all hanger and support inserts in concrete. Fish plates shall be installed where hangers are attached through steel decking.
- F. Safe working load shall not exceed 1/4 of proof test load of fastening devices.
- G. Use pipe straps or individual conduit hangers for supporting individual conduits.
- H. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 200 pounds. Secure each conduit with U-bolts or other approved fasteners.
- I. Support conduit independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.
- J. Independently support conduit. Do not use other supports i.e., (suspended ceilings, suspended ceiling supporting members, lighting fixtures, mechanical piping, or mechanical ducts).
- K. Fasteners and Supports in Solid Masonry and Concrete:
 - 1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
- L. Hollow Masonry: Toggle bolts are permitted. Bolts supported only by plaster are not acceptable.
- M. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.
- N. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.
- O. Chain, wire, or perforated strap shall not be used to support or fasten conduit.

- P. Vertical Supports: Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.

3.3 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Welded threaded studs or spring-tension clamps on steel.
 - a. Field Welding: Comply with AWS D1.1.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

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3.4 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

- 1. Raceways include the following:

- a. RMC.
 - b. RNC.
 - c. EMT.
 - d. Wireways.
 - e. Surface Metal Raceway (SMR).

- 2. Boxes, enclosures, and cabinets include the following:

- a. Device boxes.
 - b. Outlet boxes.
 - c. Pull and junction boxes.
 - d. Cabinets and hinged-cover enclosures.

- B. Related Sections include the following:

- 1. Division 26 Section "Common Work Results for Electrical" for raceways and box supports.
 - 2. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. LFNC: Liquidtight flexible nonmetallic conduit.

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- F. RMC: Rigid metallic conduit.
- G. RNC: Rigid nonmetallic conduit.
- H. SMR: Surface Metal Raceway.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

1.5 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Metal Conduit and Tubing
 - a. Allied Tube & Conduit; a Tyco International Ltd. Co
 - b. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - c. Anixter Brothers, Inc.
 - d. Triangle PWC, Inc.
 - e. Wheatland Tube Company.
 - f. Wiremold Legrand Company.
 - 2. Conduit Fittings:
 - a. Crouse-Hinds; Div. of Cooper Industries.
 - b. Emerson Electric Co.; Appleton Electric Co.
 - c. Hubbell, Inc.; Killark Electric Manufacturing Co.
 - d. Lamson & Sessions; Carlon Electrical Products.
 - e. O-Z/Gedney; Unit of General Signal.
- B. Rigid Steel Conduit: ANSI C80.1.

1. Rigid steel conduit shall be zinc coated, or galvanized or sherardized on all surfaces. An additional bituminous coating shall be applied over the zinc where installed in wet locations. Conduit fittings shall be made from the same grade of steel as rigid steel zinc coated conduit and shall be treated, protected, threaded, etc., in every way according to the requirements for rigid steel zinc coated, conduit, insofar as they apply.
- C. Aluminum Rigid Conduit: ANSI C80.5.
- D. IMC: ANSI C80.6.
1. Galvanized intermediate metal conduit may be used for the installation of conductors where permitted by the National Electrical Code. Intermediate metal conduit shall be assembled with threaded couplings and connectors similar to that specified for rigid conduit. Conduit shall conform to Article 345 of the National Electrical Code. Conduit shall be hot-dipped galvanized steel manufactured in accordance with UL Standard No. 6, or UL Standard No. 1242.
- E. EMT: ANSI C80.3.
1. Electrical metallic tubing shall be zinc coated, galvanized or sherardized on all surfaces. Tubing shall bear the Underwriters' and manufacturer's label and shall conform to Federal Specifications WW-C-563. Maximum size of electrical metallic tubing permitted is 4" size. Electrical metallic tubing shall not be installed in wet locations.
- F. FMC: Zinc-coated steel.
- G. LFMC: Flexible steel conduit with PVC jacket.
- H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed
1. Compression fittings shall be used for EMT up to two (2) inches. On EMT conduits larger than two (2) inches, compression fittings or steel-sleeve set screw fittings shall be used.
 2. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
- I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.
- 2.2 NONMETALLIC CONDUIT AND TUBING
- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Certainteed Corp.; Pipe & Plastics Group.
 2. George-Ingraham Corp.
 3. Lamson & Sessions; Carlon Electrical Products.

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4. R&G Sloan Manufacturing Co., Inc.
 5. Thomas & Betts Corp.
- B. ENT: Not Permitted.
- C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- D. LFNC: UL 1660.
- E. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.
- F. Fittings for LFNC: UL 514B.

2.3 METAL WIREWAYS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hoffman.
 2. Keystone/Rees, Inc.
 3. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Wiremold Company (The); Electrical Sales Division, Designer Series, or approved equal.
 2. All surface mounted raceway shall meet requirements for CAT 6A shielded data cabling.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. Hoffman Engineering Co.; Federal-Hoffman, Inc..
 - 3. O-Z/Gedney; a unit of General Signal.
 - 4. RACO; a Hubbell Company.
 - 5. Thomas & Betts Corporation.
- C. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- D. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.
- E. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.
- F. Nonmetallic Floor Boxes: Nonadjustable, round.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- I. Provide and install steel outlet box. Boxes shall be of approved design and construction and in every instance be of such form and dimensions as to be best adapted to its specific location, kind of fixtures to be used, and the number, size, and arrangements of conduits connecting thereto. The boxes and covers shall be made of pressed steel galvanized, of not less than 1/16" thickness. Boxes in Mechanical and Electrical Equipment Rooms and all other locations shall be installed flush with wall or ceiling construction where possible.
- J. Cast aluminum device boxes with rounded edges and corners, complete with matching coverplates, shall be used in connection with exposed conduit work for switches and receptacles in all unfinished locations including pipe spaces. Boxes shall be of the Cast Hub type as manufactured by Crouse-Hinds, Appleton or Thomas and Betts. Exposed boxes and conduit may be used only when specifically approved at each location designated. All exposed box locations must be approved by the Architect prior to installation.
- K. Boxes at exterior of building shall be flush mounted, cast iron, water tight, with gaskets and bolted-on covers. Boxes for all exterior fixtures, exterior receptacles, etc., mounted in exterior walls of the building or flush mounted at other exterior locations shall be cast iron or cast aluminum gasketed and made weathertight.
- L. Where the space limitations or other local conditions influence the arrangement and details of the outlet, special forms and design of outlet boxes shall be used to secure a proper, complete, and workmanlike arrangement at the outlet.

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- M. Diamond expansion, cinch, or Rawl plug anchors shall be used in all cases for securing boxes to masonry walls or partitions.
- N. All outlet boxes shall be provided with covers and they shall be of such construction and design as to exactly fit and match the box in which they are installed. Covers in exposed locations shall be stainless steel unless specified otherwise herein.
- O. Ceiling and wall outlet boxes generally shall be 4" square or octagon with plaster rings and shall have two screw holes for mounting receptacles when same are specified. Gang boxes and adjustable covers shall be used where wall switches occur in gangs. Metal partitions shall be provided in all gang boxes where dissimilar services are installed. Thermal switches furnished by other contractors, to the Electrical Contractor for installation, will have separate wall plates and may be mounted separately but adjacent to wall switches. Boxes for communications systems shall be of type recognized and recommended by EIA/ TIA/ BICSI and shall be sized as required to conform with the conduits connecting thereto. All boxes for switches, receptacles, special outlets, etc. shall be provided with stainless steel coverplates as herein specified.
- P. Boxes installed in concrete block or other masonry walls without a plaster finish shall be of the square corner type, single or multiple gang, made specifically for that purpose.
- Q. Boxes on prewired fixtures shall not be used for through-circuit wiring, except where the fixtures are specifically UL approved for that purpose.
- R. Multiple-gang boxes shall not be used for 277 volt switches, unless the switches are connected to the same phase. Separate boxes or barriers shall be installed for multiple switches where phase-to-phase exceeds 277 volts between switches.
- S. Provide a minimum of 1'-0" of physical separation between outlet boxes on opposing sides of the same wall. Boxes shall not be mounted back to back or within 1'-0" of any outlet box on the opposing sides of the same wall.
- T. Furnish and install metal pull boxes at least every 100 feet of run and as may be required to facilitate the pulling of wires. Pull boxes shall be of not less than No. 12 gauge galvanized steel metal of such design, construction and dimensions as to be best adapted to their respective location, number, size, and arrangement of conduit connecting thereto, and shall be provided with suitable doors, securely fastened to box with machine screws. Holes shall be provided in all boxes to receive entering conduits, but there shall be no holes except those used by conduits. Pull boxes installed flush with ceilings shall be provided with hinged doors, adjustable trim and screwdriver latch.
- U. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- V. Cabinets:
 - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid aluminum conduit
2. Concealed Conduit, Aboveground: Rigid aluminum conduit.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed: EMT or RMC.
2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT or RMC.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: Rigid steel conduit.
6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings.
2. EMT Conduit: Use Steel Compression fittings

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Minimum Raceway Size: 3/4 inch trade size.

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- C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- D. Complete raceway installation before starting conductor installation.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- G. Protect stub-ups from damage where conduits rise through floor slabs. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- I. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- J. Use steel raceway fittings compatible with raceways and suitable for use and location. For rigid steel conduit, use threaded rigid steel conduit fittings.
- K. Raceways Embedded in Slabs: Do not install raceways in floor slabs with a slab thickness of less than 4". Install in middle third of slab thickness where practical, and leave at least 1-inch concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Run conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 4. Transition from nonmetallic conduit to rigid steel conduit, or IMC before rising above floor.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- O. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.

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- P. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- Q. Telephone, data and Signal System Raceways, 2-Inch Trade Size and Smaller: In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.
- R. Install raceway sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations.
 - 2. Where otherwise required by NFPA 70.
 - 3. Where conduit sleeves penetrate smoke and/or fire walls.
- S. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.
- T. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semirecessed lighting fixtures. Use maximum of 3 feet of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.
- U. Fiberglass Conduit Elbows: Use in conjunction with RNC conduit. Patch all nicks and scrapes after installing conduits. Elbows shall have a wall thickness that provides a compressive strength that exceeds that of Schedule 40 PVC conduit.
- V. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
 - 1. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
 - 2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- W. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- X. Set floor boxes level and flush with finished floor surface.

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- Y. All conduits shall be installed in a neat, craftsman-like manner and be concealed in all finished areas. Conduit shall be installed parallel or perpendicular to walls, ceilings and other building components to present a neat appearance.
- Z. Under no circumstances will horizontal runs of conduit or tubing be permitted within walls or partitions.
- AA. The installation of all types of conduit and tubing shall comply with the following:
 - 1. Where conduits are fastened to masonry the use of screws is permitted only with expansion sleeves or Rawl plugs.
 - 2. The exact routes and location of conduit shall be determined at the site by the Contractor as the drawings are diagrammatic only and not intended to convey that information.
 - 3. Conduit that is cut shall be sawed and properly reamed.
 - 4. The ends of all conduit shall be capped or plugged to exclude dirt and debris and prevent condensation.
 - 5. Conduit that is damaged or deformed shall not be installed.
 - 6. Bending of conduits and tubing will be permitted in small sizes (less than 2" in diameter). Standard ells and fittings shall be used for larger sizes (greater than 2" in diameter) of conduit or tubing. Bends, where approved, shall be made with an approved hickey or conduit bending machine.
 - 7. Conduits and wiring shall be located to prevent their contact with heated surfaces and the conduit and wiring shall be suitably insulated, where required, to resist excessive heat. All work must be done in a manner that will not interfere with or detract from the fireproofing and smokeproofing of the building structure. Openings around conduits and penetrations through fire-rated floors, walls, partitions and ceilings shall be sealed with high temperature fire-resistant and fireproof materials and sealed with metal fire stops. O.Z./Gedney "Fire Seal" fittings, or equivalent, shall be used.
 - 8. Sleeves shall be installed in concrete and masonry. Sleeves shall be large enough to receive the conduit.
 - 9. Where vertical conduits pass through floors in mechanical or electrical equipment areas, chases or pipe spaces, the Contractor shall construct watertight sleeves made up of a section of Schedule 40 steel pipe extending 2" above the floor.
 - 10. Where vertical conduits pass through floors in finished spaces, the Contractor shall construct watertight sleeves made up of a section of steel pipe of proper length to extend through masonry and terminate flush on finish side.
 - 11. Where horizontal conduits pass through walls, sleeves shall be as specified above terminating flush with finish on each side.
 - 12. Where vertical conduits pass through plaster ceilings, sleeves shall be No. 18 gauge galvanized steel flush with ceiling.
 - 13. Space between sleeve and conduit shall be filled with sealant to level of sleeve. Sealant shall be approved "Fire Stopping" and shall maintain the fire rating of the wall or floor in which it passes through. "Fire Stopping" shall conform with manufacturer's recommended installation procedures.
 - 14. Seal openings through walls of air plenum spaces and relief air shafts, where conduits are installed under this Contract to assure airtight plenum spaces. Coordinate work with contractors of other trades.
 - 15. Where conduits pass through fire and smoke barrier stops, ceilings, floors or walls, this Contractor shall thoroughly seal such openings with fire-rated sealant as required to maintain fire-rating of adjacent construction.

16. The Contractor shall furnish and install modular wall seals where conduits pass through exterior walls. Seals shall be "Link-Seal" modular wall and casing seal, as manufactured by Thunderline Corporation, or approved equal. Sleeves shall be of appropriate size for the size of conduits to be installed, in accordance with the manufacturer's recommendations. The seal shall be composed of identical solid rubber links, bolted and interlocked to form a belt. As belt bolts are tightened, rubber links form an automatic protective seal. The seal shall be rated for 40 feet of head or 20 psig. Seal shall be capable of absorbing shock transmitted either from changes in internal pipe pressures or from ground disturbances. Seal shall be made of synthetic rubber material especially compounded to resist aging, ozone, sunlight, water, and chemical action, and shall provide low temperature flexibility and resistance to high temperature environments. Bolts and metal parts shall be of carbon steel and zinc phosphate plated to resist corrosion. The seal shall be capable of providing air tightness in above ground installations and hydrostatic sealing in below grade installations. Seal shall be capable of maintaining cathodic protection with Delrin plastic pressure plates. Install seals in accordance with Manufacturer's Bulletin LS-104. Brush underground metal parts with a good grade of mastic before backfill.

3.3 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.4 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Equipment identification labels.
 - 7. Miscellaneous identification products.

1.3 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage.
- C. Colors for Raceways Carrying Circuits at More Than 600 V:
 - 1. Black letters on an orange field.
 - 2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch high letters on 20-inch centers.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or more: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.2 CONDUCTOR IDENTIFICATION MATERIALS

- A. Conductors rated at 600V or Less:
 - 1. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Conductors rated at more than 600V:
 - 1. Identified by a durable nonmetallic engraved tag at every point of access at both ingress and egress points of manholes. Tags shall be white with black lettering.

2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70, NFPA 70E and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs for interior use:
 - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 - 2. 1/4-inch grommets in corners for mounting.
 - 3. Nominal size, 7 by 10 inches.
- D. Metal-Backed, Butyrate Warning Signs for exterior use:
 - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
 - 2. 1/4-inch grommets in corners for mounting.
 - 3. Nominal size, 10 by 14 inches.
- E. Provide arc flash hazard labels with the following information:
 - 1. Flash Protection Boundary.
 - 2. Incident Energy at 18" expressed in cal/cm^2 .
 - 3. Hazard Risk Category.
 - 4. PPE Required.
 - 5. Voltage Shock Hazard.
 - 6. Limited shock approach boundary.
 - 7. Restricted shock approach boundary.
 - 8. Prohibited shock approach boundary.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/8 inch thick.
 - 1. Engraved legend with black letters on white face
 - 2. Punched or drilled for mechanical fasteners.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

- C. Receptacle and switch cover plates shall have self adhesive labels that indicate panel and circuit number and durable wire markers or tags shall be used inside the outlet boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas or use solid colored conduit as manufactured by Allied Tube and Conduit or equal.
 - 1. Apply the following colors to the systems listed below:
 - a. Fire Alarm System: Red.
 - b. Data/Communication: Blue.

3.2 IDENTIFICATION SCHEDULE

- A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inchwide black stripes on 10-inch centers over orange background that extends full length of raceway or duct and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch-high black letters on 20-inch centers. Stop stripes at legends. Apply to the following finished surfaces:
 - 1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
 - 2. Wall surfaces directly external to raceways concealed within wall.
 - 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

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- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. Control.
 - 2. Power.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 4 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral: White.
 - 5) Ground: Green.
 - 6) Isolated Ground: Green with yellow stripe.
 - 2. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Date of installation; e.g. INSTALLED JULY 2020.
- E. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- F. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

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- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
 1. Comply with 29 CFR 1910.145.
 2. Identify system voltage with black letters on an orange background.
 3. Apply to exterior of door, cover, or other access.
 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
- J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch high letters on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Enclosed switches.
 - e. Enclosed circuit breakers.
 - f. Enclosed controllers.
 - g. Push-button stations.
 - h. Power transfer equipment.
 - i. Contactors.
 - j. Remote-controlled switches, dimmer modules, and control devices.
 - k. Battery-inverter units.

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- l. Monitoring and control equipment.
- m. Receptacles.
- n. Lighting Switches.

END OF SECTION 260553

SECTION 260923 - DIGITAL - NETWORK LIGHTING CONTROLS

PART 1 - SUMMARY

- A. The following specification details the minimum compliance and related criteria for a complete and fully operational distributed intelligence sensor and lighting control system for all interior lights.

1.2 REFERENCES

- A. American National Standards Institute/ (ANSI) (www.ansi.org)
C62.41-1991 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- B. Institute of Electrical and Electronic Engineers (IEEE) (www.ieee.org)
802.3af-2003 – Power over Ethernet standard
- C. International Electrotechnical Commission (www.iec.ch)
IEC/EN 61000-4-2:2009 Electrostatic Discharge Testing Standard.
- D. International Organization for Standardization (ISO) (www.iso.ch)
9001:2000 – Quality Management Systems.
- E. National Electrical Manufacturers Association (NEMA) (www.nema.org)
WD1 (R2005) - General Color Requirements for Wiring Devices.
- F. Underwriters Laboratories, Inc. (UL) (www.ul.com)
916 – Energy Management Equipment
- G. Federal Communications Commission (FCC) (www.fcc.gov)
Title 47 CFR Part 15 Class A

1.3 SYSTEM DESCRIPTION

- A. The lighting control system shall be capable of providing all of the following functions for all lighting:
 - 1. Continuous dimming and automatic on/off controls.
 - 2. Occupancy control.
 - 3. Vacancy control.
 - 4. Daylight harvesting.
 - 5. Temperature sensing.
 - 6. Load management.
 - 7. Task Tuning.
 - 8. Outage reports.
 - 9. Utility grade metered energy savings reports.

10. The lighting control system shall be capable of continuous dimming and switching allowing each fixture to monitor its local environment and provide distributed control in response to environmental changes.
11. The lighting control system shall provide network backhaul of all environmental readings for all light fixtures including power consumption, occupancy information, and temperature information.
12. The lighting control system shall be provisioned and commissioned by means of strobing a laser at the sensor or wirelessly with a PC and mapping the sensor to a floor plan of the building.
13. The lighting control system includes the following components:
 - a. Sensors each contain a passive infrared sensor, digital photocell, digital temperature sensor, microprocessor and a wireless radio.
 - b. For systems using controllers, each one shall contain a utility grade power meter chip and a latching relay which powers the sensors and sends the control signal to the light's ballasts or drivers.
 - c. For systems without separate controllers, the functionality of the controller shall be integrated into an LED driver such as the Philips XSR or have independent functionality when using 2-wire sensors.
 - d. Battery powered, wireless room controllers with dimming, on/off and scene selection features for manual override.
 - e. Gateways which wirelessly communicate with the sensors, aggregate the data collected by the sensors and transmit it to a central node that can reside on the premises or in the cloud.
 - f. This central node can store data collected by the sensors and host the software for a web-based graphical user interface for light management and energy savings display software.
 - g. Reports shall include graphical visualization tools for playback of occupancy and heat over time, usage by space types (conference rooms, open office areas, etc.), space utilization, and power usage.
 - h. Electronic Dimmable Ballast and/or LED Dimming Drivers. The project shall use standard Electronic dimmable 0-10 volt drivers or Philips XSR type drivers U.O.N.

1.4 SUBMITTALS

- A. Specification Conformance Document - Indicate whether the submitted equipment:
 1. Meets specification exactly as stated.
 2. Meets specification via an alternate means and indicate the specific methodology used.
 3. Shop Drawings; include:
 - a. Schematic (one-line diagram) will be specific to the project. Generic one-line diagrams will not be accepted. Provide drawing details for field installation that are specific to the project.
 - b. Wiring diagrams for alternative installation configurations.
 4. Product Data: Catalog data sheets with performance specifications demonstrating compliance with specified requirements and are specific to the project.

5. Sequence of Operation to describe how each component operates and how any building wide functionality is achieved to exceed local energy code (Title 24 2016, ASHRAE 90.1 2013, IECC 2015, or any newer versions of these codes.
6. Provide a description of the system.
7. Follow-up by Field Services for “fine tuning” and programming to occur approximately 90 days after system turnover.
8. This will involve no additional charge.

1.5 CLOSEOUT SUBMITTALS

- A. Sustainable Design Closeout Documentation.
- B. Lighting control system manufacturer to provide an Operation and Maintenance Manual that details the start-up procedure being performed including a process to follow, details on tests performed and an area that documents any test results.

1.6 QUALITY ASSURANCE

- A. Manufacturer: manufacturer must have 5 years of experience in the manufacture of electronic field devices.
- B. System components:
 1. Listed by UL specifically for the electronic ballast/driver loads. Provide evidence of compliance upon request.
 2. Listed by FCC specifically for the required wireless communication protocols. Provide evidence of compliance upon request.

1.7 APPROVALS

- A. 10-working days prior approval before bid date is required for alternate proposals.
- B. Complete catalog data, specifications and technical information on alternate equipment must be furnished to the Architect and Owner at least 30 business days in advance of the submission of approved Construction Documents.
- C. For wired alternatives, manufacturer shall provide wiring diagrams and architectural details of interconnecting wiring for power signal and control. Contractor shall provide a labor cost (adder or deduction) to install the wired alternative to the lighting control system.

1.8 PROJECT CONDITIONS

- A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:
1. Ambient temperature for indoor devices: 0 degrees to 50 degrees C (32 degrees to 122 degrees F).
 2. Ambient temperature for outdoor devices: -35 degrees to 85 degrees C (-31 degrees to 185 degrees F).
 3. Relative humidity: Maximum 90 percent, non-condensing.
 4. Lighting control system must be protected from dust during installation.
 5. Ambient temperature for Lighting Management Appliance: 10 degrees C to 35 degrees C (50 degrees F – 90 degrees F).

1.9 WARRANTY

- A. Provide manufacturer's Enhanced 5 Year Limited Warranty:
1. 5-year limited warranty for the replacement of defective system components from the date of system startup completion.
 2. Contractor shall provide limited workmanship warranty for one year from customer acceptance.
 3. A standard 0-10V dimmable ballast or driver module warranty is 5 years. When purchased with a lighting control system this warranty shall also be 5 years by the lighting fixture manufacturer.
 4. For ballasts and drivers, see appropriate section that includes Interior Lighting Fixtures, Lamps, Ballasts and Drivers: Fluorescent Electronic Dimming Ballasts and Electronic LED Drivers.

1.10 MAINTENANCE MATERIAL SUBMITTALS

- A. The manufacturer shall make available to the End-User a method of ordering new equipment for expansions, replacements and spare parts through established distributor channels.
- B. The manufacturer shall make new replacement parts available for minimum of 5 years from date of manufacture.
- C. The manufacturer shall make directly available to the owner additional software apps that may be desired for a minimum of 10 years from the system's date of purchase.
- D. The manufacturer shall provide extended support that is billable at an hourly rate OR support that can be purchased on an annual maintenance contract basis.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Enlighted Inc. – System: Enlighted’s Distributed Intelligence Sensor Network and Lighting Controls System.

2.2 GENERAL

- A. Lighting Controls: Ten-year operational life while operating continually at any temperature in an ambient temperature range of 0 degrees C (32 degrees F) to 50 degrees C (122 degrees F) and 90 percent non-condensing relative humidity. Equipment designed for outdoors must have an operating temperature range of -35 degrees C (-31 degrees F) to 85 degrees C (185 degrees F).
- B. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC/EN 61000-4-2:2009.
 - 1. Electrostatic charge builds up on people as a result of friction (walking across a carpet). When a person touches an electronic device, a discharge can occur and cause damage. Electrostatic Discharge (ESD) testing is done according to the IEC/EN 61000-4-2:2009 standard (human body model). Testing should be completed on all user accessible points such as terminal blocks, buttons, and control inputs.
 - 2. Testing conducted shall prove devices and equipment can operate “without impairment of performance” as the pass/fail criteria.

2.3 SENSORS AND CONTROL UNITS

- A. Ceiling Mounted or Fixture Mounted Built Environment Sensors.
- B. Product: Built Environment Sensor.
- C. Components
 - 1. Passive Infrared Occupancy Sensor.
 - 2. Digital Ambient Light Sensor.
 - 3. Digital Temperature Sensor.
 - 4. Processing Mechanisms:
 - a. Microcontroller in each sensor.
 - b. Communication Mechanism.
 - c. Low power 2.4 GHz Transceiver based on IEEE 802.15.4 with an option for Bluetooth enabling.
 - 5. Other:
 - a. Unique internal reference number visibly displayed on module cover.

D. Operations:

1. Sensors shall monitor changes in occupancy, changes in ambient light levels and changes in temperature and communicate digital control commands to light fixtures according to a control strategy stored locally in the sensor.
2. Sensor shall wirelessly transmit occupancy; light level, power and temperature information to a gateway device which allows the data to be stored in a central location on premises or in the cloud.
3. Sensors shall be fully adaptive with the ability to have the sensitivity and timing to be remotely adjusted to ensure optimal lighting control for any use of the space.
4. Sensors have remotely adjustable settings for dimming levels, active motion windows for occupancy/vacancy sensing, and sensitivity to changes in motion and changes in ambient light levels.
5. Sensors have the ability to remotely adjust light output to reduced levels and linger at that reduced level for an adjustable time period before turning off when a space is vacant.
6. Sensors have the ability to remotely adjust their sensitivity to the magnitude, stability of changes in ambient light levels and sensors have the ability to remotely adjust the timeframe between daylight harvesting events.
7. Sensors can respond to Lighting Power Density levels that can be specified either to a defined LPD OR a percent reduction over an existing ASHRAE or Title 24 standard.
8. If power is interrupted and subsequently returned, lights automatically return to their setting prior to power interruption.
9. Sensors incorporate non-volatile memory. Should power be interrupted and subsequently restored, settings and learned parameters saved in protected memory shall not be lost.
10. Programming is stored in each sensor in addition to the Energy Manager. Sensors operate indecently from Energy Manager, so there cannot be single point failure. Systems must operate so there is no single point of failure.
11. Responds to digital (load shed command) Demand Response signal.
12. Sets high end trim via priority assigned in profile.
13. Automatically scales light output proportional to load shed command.
 - a. Example: If light output is at 30 percent and a load shed command of 15 percent is received, the ballast/driver automatically sets the maximum light output at 85 percent and lowers current light output by 4.5 percent to 25.5 percent.

E. Electrical/Connections:

1. Sensor shall connect to a 0-10V dimmable ballast or driver via a controller or connect to Enlighted enabled drivers without the use of Enlighted control unit.
2. Sensor shall connect to a controller via a low voltage cable for interior applications or Ruggedized Sensors for exterior applications.
3. If power dropouts in the event of a brown-out or black-out, when power is restored, the lighting system should recover quickly and automatically return to the last lighting levels. A momentary interruption (1 or 2 seconds) of power should not cause extended periods (20 seconds or more) without lighting while the system reboots and all other electrical equipment is back on.
4. Manufacturer to provide all necessary mounting hardware and instructions for the specific conditions under which the components shall be installed.
5. Sensor shall be FCC certified.
6. Sensor shall be a Class 2 device.

7. Sensor shall communicate no more than 300 bytes per minute.
8. System shall have user initiated manual demand response.
9. System shall be ADR 2.0a compliant. Systems that simulate ADR shall not be acceptable.

F. Controller:

1. Product: Control Unit.
2. Components:
 - a. Utility Grade Power Meter capable of 1% power measurement accuracy.
 - b. Controller to include latching relay, to decrease power requirements of the power pack.
 - c. Operate Bounce Time: 3 ms. Max.
 - d. Max Switching Voltage 277VAC and 125VDC.
 - e. Insulation Rating: Class B and Class F.
 - f. Operations:
 - g. Controller shall measure the actual wattage of the fixture(s) that it controls.
 - h. Controller shall meter real-time energy use at each fixture.
 - i. Controller shall communicate real-time energy use to sensor unit.
 - j. Electrical/Connections:
 - k. Circuit protection:
3. Listed to UL 916.
4. FCC Part 15 Class A certified.
 - a. Wiring instructions shall be included on unit.
 - b. Controller shall be plenum rated.
 - c. Control wiring between sensors and control units shall be Class 2, 18-24 AWG, stranded or solid depending on the application U.L Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums, where applicable.

2.4 LIGHTING CONTROL DEVICE DETAILS

A. Enlighted Energy Manager

1. Spaces shall be equipped with an automatic control device to shut off lighting in those areas. This automatic control device shall function on either: 1) a scheduled basis, using time of day, with an independent program schedule that controls the interior lighting in areas that do not exceed 5,000 square feet and are not more than one floor, or 2) an occupant sensor that shall turn lighting off within 20 minutes of an occupant leaving a space, or 3) a signal from another control or alarm system that indicates the area is occupied.

2. Provide Enlighted Energy Managers in the locations and capacities as indicated on the plans and schedules. Each Enlighted Energy Manager shall have the following capabilities:
 - a. The Enlighted Energy Manager serves as the user interface to the Enlighted Intelligent Lighting Control System. It is a server class appliance that discovers, commissions and manages Enlighted's Sensor Units. It is available as a family of appliances that support various advanced features through licensing. The intuitive graphical user interface can be accessed using a standard web based browser.
 - b. Offers an interface that allows the system to communicate with the Building Management System (BMS) or Building Automation System (BAS). A BMS/BAS enables occupant data to be further utilized to allow for more efficient usage of a building and space. A BMS/BAS can utilize data from the Enlighted System for providing increased savings by optimizing the operations of a building's HVAC system.
 - c. Uses industry standard HTTPS security with AES-128 encryption safeguards the integrity of the entire system. Automatic backups prevent data loss and restore fixtures to operational modes. The system will provide reports that include fixture outages, lamp failure notifications, temperature and occupancy data. It constantly monitors areas to ensure that spaces are managed according to the assigned user preferences and tasks being performed.

B. Scalability and Data Integrity

1. When deployed on premise, Enlighted Energy Managers support up to 18,000 sensors. When hosted in the cloud, the Energy Manager can support multiple buildings in one instance, providing a comprehensive view of Energy Manager data for several campuses across the world.
2. Due to redundancy in the architecture, a Cloud hosted Energy Manager provides reliable data storage that can be accessed from any location at any time from a secure device eliminating a single point of failure.

C. Advanced Communications, Integration and PC Connectivity

1. The Enlighted Sensor Unit connects to the Enlighted Control Unit (CU) via a supplied cable or a Philips XSR type driver. The entire system is managed by the Energy Manager (EM) via Gateways (GW) and PoE switches using wireless communication. Wireless devices are based on the 802.15.4 technology. The CU is mounted in a lighting fixture or an approved enclosure. In the case of fluorescent lighting, the CU is installed inside the ballast cavity next to the dimming ballast. The CU may be used to control fluorescent, HID or LED systems controllable with a 0-10V input. The sensor is connected to the light fixture which helps in establishing control. The Sensor Unit communicates wirelessly with the gateway. The gateways on each floor are connected to the Energy Manager through a POE Switch (Network Switch). The EM is connected to the Local Network through a POE switch (Network Switch) and is assigned a designated static IP address.

D. Operator's Software

1. User programming and editing may be conducted online in web-based software. Data shall be entered through a simple menu-driven user interface. The operators' software provides all the information to the user regarding the consumption and saving of the energy utilized in the building environment. The basic operating software shall provide the following:
 - a. Site wiring documentation for all connected fixtures and system components shall be in O&M manual and project submittals. Reflected ceiling plan shall also be present in the software to show the location of components.
 - b. English descriptions of each circuit switch and calculated load.
 - c. Monitor/Control all fixtures.
 - d. Software shall show actual fixture states, with an optional menu showing how and when the fixture change occurred.
2. System Parameters:
 - a. System software to be sized based appropriately for the system which can be an unlimited number of fixtures. Any number of sites may be programmed from a single user interface.
 - b. Password features shall be allowed per site.
 - c. Configure software to automatically contact remote sites using a modem or I/P address.
 - d. Maximum CAT 5e / CAT 6 cable distance between the Enlighted Energy Manager and a network switch, an Enlighted Gateway and a network switch or a network switch to a network switch is 330 feet. Care shall be taken when routing the cable to not exceed the 330-foot limitation including travel distance up and down structures.

E. Central Programming, Monitoring and Control Workstation

1. The control workstation (Enlighted Energy Manager) shall provide monitoring, programming and control of the system. The system shall be shipped complete with all memory, cables, and peripheral devices. The complete system shall be factory tested prior to shipment. The system shall include at a minimum:
 - a. Energy Manager (Lanner Celeron)
 - 1) 0-1,200 devices.
 - 2) Memory: 4 GB
 - 3) CPU: Intel Celeron J1900, 2 GHz
 - 4) Hard Disk: 128 GB SSD
 - b. Mid-Range Energy Manager (Lanner i7)
 - 1) 0-7,500 devices.
 - 2) Memory: 8 GB
 - 3) CPU: Intel i7-3517UE, 2.8 GHz
 - 4) Hard Disk: 128 GB SSD

c. Enterprise Energy Manager (Dell)

- 1) 0-18,000 devices.
- 2) Memory: 16 GB
- 3) CPU: Intel Xeon E5-2600v3 with 8 cores
- 4) Hard Disk: 1 TB (2-500 GB SATA)

F. Ethernet Multi-User Connectivity-Weblink

1. The EM has 2 network cards. One (1) of the network cards connects it to the intranet and the other network card connects the EM to the building network via PoE switch (Network Switch). The EM GUI runs in a web browser, such as Internet Explorer, Firefox, Safari or Chrome.

G. Scheduling Profile and Groups

1. Profile

- a. “A lighting profile”, which is typically shortened to just profile, is a named set of configuration values that determine the setting of the light level of the luminaire (lighting fixture). The configuration values are used by the intelligence in the fixture along with the current operational mode, past and present sensor values, time of day, day of the week, and passage of time to control the light level. How the light is turned on and off and the light level set, is called the behavior of the light.

2. Groups

- a. “Groups of fixtures” is a new foundation technology added to the Enlighted software. Groups are used to allow all fixtures in the same group to share their occupancy state. Such groups are called a motion group.
- b. Motion Group
 - 1) The use for motion groups is for all fixtures in a room (e.g. conference room) to change to the occupied state (typically resulting in a fixture turning on their lights) when any fixture senses occupancy, and for all fixtures in a room to stay in the occupied state as long as any fixture senses occupancy.
 - 2) Without the motion group capability (and configuration), lights at the *far end* of a *large room* will not sense an occupant entering the room and then adjust their light level.
 - 3) With the motion group capability being configured for all of the fixtures in the room, when an occupant enters the room, the detection is communicated to all members of the group, and all fixtures will then react to the occupant and adjust their light levels according to their configuration. And when the room is occupied, this state is communicated to all members of the group. This typically results in all fixtures in the conference room staying lit while the room is occupied.

H. Daylighting Controls

1. Enlighted Sensor (Daylight)

- a. The Enlighted Sensor (sensor) shall have the ability to sense daylight in the surrounding areas. This feature shall allow the automatic reduction of ambient lighting levels when sufficient daylight is present to maintain the programmed foot-candle levels. The daylight sensing feature shall be included in one sensor that also has the ability to sense motion, temperature control and individual energy monitoring.

I. Motion Controls

1. Enlighted Sensor (Passive Infrared-PIR)

- a. The Enlighted Sensor (sensor) shall have the ability to sense motion through passive infrared detection in the surrounding areas. This feature shall allow the automatic activation of lighting to preset levels when motion is detected and provide the automatic reduction of lighting to preset levels when no motion is sensed after the programmed time-out period. The motion sensing feature shall be included in one sensor that also has the ability to sense daylight, temperature control and individual energy monitoring.
- b. Areas larger than 100 square feet shall require 4 levels of lighting control or be fully dimmable.
 - 1) Fixtures must be dimmable with 0-10 volt drivers or ballasts.

J. Energy Dashboard

1. Enlighted Energy Manager

- a. The Enlighted Energy Manager shall have the ability to provide real-time graphic information concerning the energy usage of the individual lighting fixtures. This information shall include but not be limited to:
 - 1) Displaying the building floor plan with the "ON" or "OFF" status of each light and the ability to zoom into to any fixture and get expanded operating information.
 - 2) Providing real-time information for any lights that are not functioning and the date when they stopped working.
 - 3) Employee flow patterns to see areas that are being used or not used.
 - 4) Temperature graphs to show areas that might be too hot during certain times of the year to allow targeting of these areas requiring additional shading or areas that are too cold allowing adjustment of the HVAC system to compensate.
 - 5) Sunlight penetration patterns throughout the year.
 - 6) After-hours detection of anyone entering or leaving the building.
 - 7) Enhanced security by documenting date, time and path or any entry into the building.
 - 8) Remote troubleshooting of the system.

- 9) Reports that show variance reporting from historical averages.
- 10) Real-time views of building energy usage through a local monitor.

K. Shading Control

1. Enlighted Energy Manager

- a. When used with a supplemental interface, the Enlighted Energy Manager shall have the ability to integrate with a third party shading controller that provides dry contact closures to facilitate the opening of a shade if there is too little ambient light or closing of the shade if it is too bright or a meeting requires reduced lighting levels for a presentation.
 - 1) The level of automatic control shall be shades open or shades closed.

L. Security/Fire-Life Safety Control

1. Enlighted Energy Manager

- a. When used with a supplemental contact closure interface, the Enlighted Energy Manager shall have the ability to communicate with security, fire-life safety systems and override designated groups that are connected to a Building Management System to have full output:
 - 1) Local Enlighted Sensors shall provide input to detect after-hours movement for security and the location of occupied spaces for fire-life safety situations to assist support personal in locating and evacuating individuals.
 - 2) When a password is provided, the Enlighted Energy Manager shall have the provision to be accessed via the internet by outside law enforcement or fire fighters for system access to determine areas of occupancy.

M. Exhaust Fan Control

1. Enlighted Plug Load Controller

- a. Working in conjunction with the Enlighted Sensor for lighting, the Enlighted Plug Load Controller can provide “ON” control of exhaust fans when an individual enters the space and “OFF” control to minimize energy usage when spaces are unoccupied.
 - 1) Provides automated exhaust fan control so no separate switch is required to turn “ON” or “OFF” exhaust fans.
 - 2) Suitable for restrooms and kitchen areas.
 - 3) The Enlighted Plug Load Controller communicates wirelessly with the Enlighted Sensor that is used for lighting within that dedicated space.

N. Private and Open Office Plug Load Control

1. Enlighted Plug Load Controller

- a. Working in conjunction with the Enlighted Sensor for lighting, the Enlighted Plug Load Controller can provide “ON” and “OFF” control of dedicated receptacles to minimize energy usage for monitors and other non-essential employee personal devices when spaces are unoccupied.
 - 1) The Enlighted Plug Load Controller communicates wirelessly with the Enlighted Sensor that is used for lighting within that dedicated space. Plug load control is one 20-amp circuit in and two 20-amp switch legs out. One switch leg is controlled and the other switch leg is not controlled. Both switch legs shall have a utility grade power chip to monitor usage. The receptacle designated as “controlled” shall be supplied by others and marked in a manner which shows that the receptacle is controlled.

O. Lighting Fixture Metering

1. Enlighted Sensor

- a. The Enlighted Sensor (sensor) shall have the ability to provide metering of each lighting fixture that contains a sensor. The sensor data shall be archived on the Energy Manager. The energy monitoring feature shall be included in one sensor that also has the ability to sense motion, daylight and temperature control.

P. User Control

1. Enlighted Energy Manager

- a. If employee level control of local lighting fixtures is allowed, the Enlighted Energy Manager shall allow individual users the ability to dim those lights immediately adjacent to their work area.
 - 1) Minimum and maximum lighting levels can be programmed that won't allow individual users to go above or below certain levels during prescribed hours.

Q. Demand Response Control

1. Enlighted Energy Manager

- a. For buildings 10,000 square feet or greater and upon notification by the local utility, the Enlighted Energy Manager shall automatically reduce lighting loads by 15% for the building when directed by the Building Management System (BMS).
 - 1) Depending upon the type of BMS, a supplemental interface may be required for the Enlighted Energy Manager.

- 2) The 15% lighting level reduction shall occur uniformly across all areas programmed to reduce lighting power for Demand Response and Automated Demand Response events.
 - a) Enlighted is Open Automated Demand Response (OADR 2.0a) compliant.
 - b) Allows option for owner manually initiated Automated Demand Response to be able to lower power consumption during peak demands.

R. Intelligent Lighting Control

1. Enlighted Energy Manager

- a. The Enlighted Energy Manager shall provide lighting controls that react to the time of day, working environment lighting requirements, daylighting, ambient lighting levels and level of activity within the building.

S. Advanced System Integration

1. Contact Closure Interfaces for Conference Rooms

- a. When used with a supplemental interface, the Enlighted Energy Manager shall integrate with conference room scheduling systems and local AV controls through third party dry contact closure interfaces or the Enlighted Energy Manager REST API.
 - 1) AV control systems like Crestron have the capacity to integrate with the Enlighted Energy Manager.

2. Contact Closure Interfaces for Shading Control

- a. When used with a supplemental interface, the Enlighted Energy Manager shall have the ability to integrate with a third party shading controllers that provides dry contact closures or by using the Energy Manager REST API to facilitate the opening of a shade if there is too little ambient light or closing of a shade if it is too bright or a meeting requires reduced lighting levels for a presentation.
 - 1) The level of automatic control shall be shades open or shades closed.

3. Other integration can be accomplished through TCP/IP.

T. Building Management System (BMS) Integration/BACnet/IP Protocol Implementation Statement (PICS)

1. BACnet/IP module, which is a licensable feature on the Energy Manager that allows integration of the Enlighted Lighting System with Building Management Systems (BMS) over BACnet/IP. The following functionality can be achieved using this interface:

- a. Read Energy Consumption for Lighting and Plug Loads at aggregate and sensor level.
 - b. Dim individual or groups of sensors.
 - c. Issue emergency signal and turn lights on at area and Energy Manager level.
 - d. Issue a Demand Response Signal.
 - e. Control individual Plug Loads.
 - f. Find out occupancy at Area level.
 - g. Other integration can be accomplished through TCP/IP for digital interfacing.
2. The Enlighted Lighting BACnet/IP interface enables BACnet/IP based integration between the Enlighted lighting control network and any BACnet compatible Building Management System (BMS). The lighting BACnet/IP software installed in the Enlighted Energy Manager provides seamless integration between the Enlighted network and BMS system via BACnet.
 3. Enlighted BACnet lighting exposes Enlighted lighting objects over BACnet/IP. After the module is installed in the Energy Manager, the lighting objects can be monitored and controlled via BACnet/IP interface.
 4. The Lighting BACnet/IP interface can be configured to run in the following two modes:
 - a. Default Mode: This mode provides data for all BACnet/IP objects for each group. For example - Area, Energy Manager.
 - b. Detailed Mode: This mode provides data for all BACnet/IP objects for all group and individual points. For example - Energy Manager, Area, Fixture and Plug Load.

U. Contact Closures

1. Enlighted Contact Closure I/O Device
 - a. The Contact Closure I/O device bridges the Enlighted sensors and devices with the Enlighted Lighting Control network. When the Contact Closure input ports are triggered, it broadcasts to the Enlighted Lighting Control network to perform the required function, which is determined by programming from the Energy Manager Graphical User Interface (GUI). We support 10 devices per Energy Manager, each of which can support 40 inputs.
 - b. Features
 - 1) Optimize Safety: When power is switched off in a building or area for any reason, the Contact Closure forces all lights to turn on when desired.
 - 2) Better Control: The Contact Closure can be programmed to turn all or selective lights to any light level including full-on. One or more switch groups in an area control the lights providing the most flexibility in managing fixture light levels.
 - 3) Increase Energy Savings: By returning all lights to normal lighting profiles specified in the Enlighted lighting network, the Contact Closure eliminates energy waste due to lights turned on to the maximum capacity.

c. Programmed Digital Inputs

- 1) Set all fixtures in Energy Manager to any preferred light level
- 2) Set all fixtures in Switch Group to Scene in order to manage a sub-group of fixtures
- 3) Set all fixtures to Auto mode to default to profile settings
- 4) No Action

2.5 BALLASTS/DRIVERS

- A. Product: 0-10V dimmable programmable ballast OR 0-10V dimmable LED power electronics.

2.6 MANUAL OVERRIDE CONTROLLERS

- A. Wireless Enlighted Room Controllers (ERC).

- B. Product: Enlighted Room Controller

- C. Components:

1. 4 button control key pad
2. Digital Temperature Sensor
3. Communication Mechanism
 - a. Low power 2.4 GHz Transceiver for IEEE 802.15.4
4. Security
 - a. AES 128 encryptions
5. Other:
 - a. CR2025 battery (7-year life)
6. Digital addressable systems require reprogramming when ballasts or drivers fail. Without a visible unique serial ID, extensive documentation and additional support is required to replace multiple ballasts or modules.

- D. Operations:

1. Room controller shall be battery powered and wirelessly communicate with the sensors. Battery shall be available through commercial retailers.
2. Room controller shall have the ability to be programmed to allow for a space to be controlled with an Auto-on / Auto-off control strategy or a Manual-on / Auto-off control strategy.
3. Room controller shall have the ability to brighten, dim, turn on and off fixtures.
4. Room controller shall have the ability to recall 6 user programmable scenes and each scene can be remotely adjusted.

5. Room controller shall make a temperature reading any time one of its buttons is depressed and shall wirelessly transmit the temperature data to the sensors it controls

2.7 GATEWAYS

A. Product: Gateway

B. Components:

1. Low power 2.4 GHz Transceiver for IEEE 802.15.4
2. Electrical/Connections:
3. Gateways shall wirelessly collect data from sensor units and relay it to the Lighting Energy Manager.
4. Gateways shall communicate over IP to Lighting Energy Manager.
5. Gateway connection cables shall be plenum rated.
6. Gateways shall be Powered-over-Ethernet at 48V.
7. Gateway Units shall be FCC Part 15 Class A, RoHS certified.
8. Gateways shall be Class 2 devices.

C. Operations:

1. Gateways are used for information gathering and commissioning communications only; lighting control remains with the individual sensors and power packs.
2. Gateways are used for information gathering and commissioning communications only; lighting control remains with the individual sensors and power packs.
3. Data Collection Mechanism:
 - a. Gateways shall communicate with sensors wirelessly via 802.15.4 protocol.
 - b. Gateways communications frequency shall be RF 2405-2480MHz.
 - c. Gateways shall support AES 128-bit encryption.

2.8 ENERGY MANAGEMENT HARDWARE

A. Product: Lighting Energy Management Server

B. Operations:

1. Used 24 hours per day, 7 days per week to program, monitor, control, and provide data logging of digital network lighting controls.
2. Server can either be local (at the client site) or cloud-based.
3. Server software preinstalled and tested prior to shipping.

OR

4. Cloud-based server configured and tested by the manufacturer before being operated at client.

5. Server data can be accessed through a secure web portal assigned by I.T. personnel.

2.8 ENERGY MANAGEMENT SOFTWARE

- A. The Enlighted Energy Manager shall be comprised of one of the configurations listed below. The system shall include at a minimum:
 1. Energy Manager (Lanner Celeron)
 - a. 0-1,200 devices.
 - b. Memory: 4 GB
 - c. CPU: Intel Celeron J1900, 2 GHz
 - d. Hard Disk: 128 GB SSD
 2. Mid-Range Energy Manager (Lanner i7)
 - a. 0-7,500 devices.
 - b. Memory: 8 GB
 - c. CPU: Intel i7-3517UE, 2.8 GHz
 - d. Hard Disk: 128 GB SSD
 3. Enterprise Energy Manager (Dell)
 - a. 0-18,000 devices.
 - b. Memory: 16 GB
 - c. CPU: Intel Xeon E5-2600v3 with 8 cores
 - d. Hard Disk: 1 TB (2-500 Sata)
- B. Provide system software license that is designed, tested, manufactured, and warranted by a single manufacturer.
- C. Graphical User Interface:
 1. Software shall be capable of loading floor plans of the installation and showing sensors appropriately located on each floor plan.
 2. The GUI shall show real time occupancy, energy use and on/off control for each sensor on the floor plan.
 3. The GUI shall clearly show distinct savings from task tuning, daylight harvesting, and occupancy sensing.
- D. Lighting Profiles
 1. GUI system shall facilitate mass-updating of sensor profiles by drag-and-dropping sensor units into desired profile setting. Profiles shall be available and preconfigured based on room type and to be compliant with Title 24 2016, ASHRAE 90.1 2013 and IECC 2015.
 2. User shall have the ability to update profile descriptions, including but not limited to:

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- a. Time-of-day cutoffs
- b. Light levels when occupied
- c. Ramp up and ramp down speed
- d. Time delays
- e. Sensor sensitivity

E. Data Access

1. Energy Management System shall have the ability to integrate with building management systems and building automation systems via BACnet, ModBus.

2.9 PLUG LOAD CONTROLLER

- A. Product: Digitally addressable, single relay, plug load controller. Includes utility grade metering for controlled and uncontrolled outlets. Controllers shall be capable of controlling one or more outlets up to 20A.

1. Plug load controller is paired with a sensor or group of sensors in the control, configured at the sensor during system setup. Plug load controllers shall be simple to install, fitting onto a standard junction box.

B. Operation:

1. Each controller shall be configurable to operate in the following sequences based on occupancy:
 - a. 1) Auto-on/Auto-off; 2) Manual-on/Auto-off.
 - b. The controller(s) shall also be configurable to operate in the following sequences based on scheduled control based on Normal hours/After-hours basis: 1) Scheduled ON / OFF; 2) Manual ON / Scheduled OFF.
2. Each controller shall be configurable for ADR or holiday events.
3. Data Collection: Plug load controllers shall communicate with sensors wirelessly via 802.15.4 protocol.
4. Communications frequency shall be RF 2405-2480MHz.

2.10 DATA TRANSMISSIONS SHALL COMPLY WITH AES 128-BIT ENCRYPTION SOURCE QUALITY CONTROL

- A. Perform full-function testing on all completed assemblies at end of line. Statistical sampling is not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Product: Digitally addressable, single relay, plug load controller. Includes utility grade metering.
- B. Install equipment in accordance with manufacturer's installation instructions.
- C. Provide complete installation of system in accordance with Contract Documents.
- D. Provide dedicated network between Gateways and Sensors.
- E. Provide equipment at locations that are adjusted for field conditions and in quantities indicated on Drawings. Provide any additional equipment required to provide control intent.
- F. Contractor shall be responsible for installing in the field Enlighted Control Units in all fixtures that contain any type of Enlighted sensor. They may also be installed in junction boxes if there isn't sufficient space within the fixture. For exterior sensors, contractor shall also provide a wet location enclosure that can house the Enlighted Ruggedized Sensor and Enlighted Control Unit.
- G. Contractor shall either purchase the Enlighted sensor and Enlighted Control Unit preinstalled in all fixtures or the contractor has the option of field installing the components, if a manufacturer won't preinstall the system or cannot due to space considerations. The contractor shall determine prior to bid whether or not he must include labor in his proposal to field install Enlighted components. No change orders will be allowed for field installation of any Enlighted components. Check Enlighted website for the most current list of Enlighted Luminaire OEM partners or call Enlighted for inquiries on specific fixtures and manufacturers that integrate Enlighted sensors and control units.
- H. All suspended fixtures shall have integral Enlighted sensors and Enlighted Control Units unless the manufacturer cannot preinstall the Enlighted components due to space limitations. The Enlighted sensors shall be integrated into the bottom of the fixture for a seamless appearance. The contractor shall be responsible for field modifying the suspended fixtures, if the manufacturer doesn't preinstall the components. The contractor shall contact Ed De Sousa at Enlighted at 408-687-7202 for any questions concerning options for field mounting sensors integral to the fixture body. Enlighted sensors should not be field installed behind the fixture lens as it will interfere in the operation of the PIR function, but rather in the fixture body. The contractor shall be responsible for providing a warranty that supersedes the factory warranty on any lighting fixtures that are field modified for a period of 1 year after date of installation.
- I. Enlighted shall provide a Sequence of Operations for typical control scenarios based on the room or exterior area usage. This document shall be used to program the Enlighted 4 Button Control Keypad and the Energy Manager.

3.2 SERVICE AND SUPPORT

- A. Startup and Programming

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1. Provide certified factory field service engineer to make minimum of two site visits to ensure proper system installation and operation under following parameters
 - a. Enlighted shall be notified a minimum of (2) weeks prior to requiring the site visit.
2. Qualifications for factory certified field service engineer:
 - a. Certified by the equipment manufacturer on the system installed.
3. Make first visit upon completion of installation of lighting control system:
 - a. Verify connection of sensor units to controllers and ballasts/drivers.
 - b. Place sensors onto the user-provided floor plan in the lighting energy management server.
 - c. Verify that system operation control shall be programmed based on sequence of operations (SOO).
 - d. Obtain sign-off on system functions.
4. Make second visit to demonstrate and educate Owner's representative on system capabilities, programming, fine tuning and maintenance.
 - a. Due to building operations, start-up of Lighting Control System may be required outside of normal business hours (Monday through Friday, 7 a.m. to 5 p.m.).

3.3 CLOSEOUT ACTIVITIES

A. Training Visit

1. Lighting control system manufacturer to provide 1 (one) day additional on-site system training to site personnel. This shall be a part of the second visit by field service to the site. A separate third visit will require an additional charge.
2. For LEED projects, manufacturer shall conduct an on-site walkthrough to demonstrate system functionality to a Commissioning Agent.
3. During this visit, the manufacturer's Field Service Engineer will perform tasks, at the request of the facility representative or Commissioning Agent, such as to demonstrate wall control functions, explain or describe occupancy and/or daylight sensor functionality.

B. On-site Walkthrough

1. Lighting control system manufacturer to provide a factory certified Field Service Engineer to demonstrate system functionality to the Commissioning Agent.

3.4 MAINTENANCE

- A. Capable of providing on-site service support within 48 hours anywhere in continental United States and within 72 hours worldwide except where special visas are required.

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- B. Offer renewable service contract on yearly basis, to include parts, factory labor, and annual training visits. Make service contracts available up to ten years after date of system startup. Additional service contracts and warranties need to be verified as being available.
- C. Prior to bid, confirm if an on-site meeting between the Lighting Control System Manufacturer and a Facility Representative will be required to evaluate system usage after the building has been in operation for a predetermined period of time. If a field service visit is required for Acceptance Testing or building commissioning, it shall be as an additional charge unless specifically stated in the specification and confirmed on the Enlighted bill of materials.

END OF SECTION 260923

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes individually mounted enclosed switches and circuit breakers used for the following:
 - 1. Feeder and branch-circuit protection.
 - 2. Motor and equipment disconnecting means.

1.3 SUBMITTALS

- A. Product Data: For each type of switch, circuit breaker, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each switch and circuit breaker.
 - 1. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Current and voltage ratings.
 - c. Short-circuit current rating.
 - d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 2. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- C. Field Test Reports: Submit written test reports and include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- D. Manufacturer's field service report.

- E. Maintenance Data: For enclosed switches and circuit breakers and for components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Closeout Procedures," include the following:
 - 1. Routine maintenance requirements for components.
 - 2. Manufacturer's written instructions for testing and adjusting switches and circuit breakers.
 - 3. Time-current curves, including selectable ranges for each type of circuit breaker.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA AB 1 and NEMA KS 1.
- C. Comply with NFPA 70.
- D. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

1.5 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Fusible Switches and Molded-Case Circuit Breakers:
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. Square D Co.
 - c. Siemens.

2.2 ENCLOSED SWITCHES

- A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle.

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- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with Class “R” or “L” clips to accommodate specified fuses, lockable handle with two padlocks, and interlocked with cover in closed position.

2.3 ENCLOSED CIRCUIT BREAKERS

- A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.
 - 1. Comply with molded-case circuit breaker specifications in the Division 26 section, “Panelboards.”

2.4 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 - 3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

2.5 FACTORY FINISHES

- A. Finish: Manufacturer's standard color paint applied to factory-assembled and -tested enclosures before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with mounting and anchoring requirements specified in Division 26 “Common Work Results for Electrical.”

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Common Work Results for Electrical."

- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.4 CONNECTIONS

- A. Install equipment grounding connections for switches and circuit breakers with ground continuity to main electrical ground bus.
- B. Install power wiring. Install wiring between switches and circuit breakers, and control and indication devices.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each enclosed switch, circuit breaker, component, and control circuit.
 - 2. Test continuity of each line- and load-side circuit.
- B. Testing: After installing enclosed switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
 - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.6 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges as indicated on the selective coordination study to be provided by this Contractor.

3.7 CLEANING

- A. On completion of installation, inspect interior and exterior of enclosures. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262816

SECTION 265100 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior and Exterior lighting fixtures, lamps, light emitting diodes, ballasts and drivers.
 - 2. Emergency lighting units.
 - 3. Exit signs.
 - 4. Lighting fixture supports.
- B. Related Sections include the following:
 - 1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
 - 2. Division 26 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.

1.3 DEFINITIONS

- A. BF: Ballast factor.
- B. CRI: Color-rendering index.
- C. CU: Coefficient of utilization.
- D. HID: High-intensity discharge.
- E. LED: Light emitting diode.
- F. LER: Luminaire efficacy rating.
- G. Luminaire: Complete lighting fixture, including ballast housing if provided.
- H. RCR: Room cavity ratio.

1.4 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Emergency lighting units including battery and charger.
 - 3. Driver.
 - 4. Energy-efficiency data.
 - 5. Life, output, and energy-efficiency data for lamps or LEDs.
 - 6. Samples for verification purposes of specific individual fixtures when requested by the Architect.

- B. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Lighting fixtures.
 - 2. Suspended ceiling components.
 - 3. Structural members to which suspension systems for lighting fixtures will be attached.
 - 4. Other items in finished ceiling including the following:
 - a. Air outlets and inlets.
 - b. Speakers.
 - c. Sprinklers.
 - d. Smoke and fire detectors.
 - e. Occupancy sensors.
 - f. Access panels.
 - g. Fire alarm notification devices
 - h. Power Poles
 - 5. Perimeter moldings.

- C. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

- D. Qualification Data: For agencies providing photometric data for lighting fixtures.

- E. Field quality-control test reports.

- F. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

- G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

- A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Emergency Lighting Unit Batteries: 10 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.
- B. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps: 10% of each type and rating installed. Furnish at least one of each type.
 - 2. Plastic Diffusers and Lenses: 1% of each type and rating installed. Furnish at least one of each type.
 - 3. Battery and Charger Data: One for each emergency lighting unit.
 - 4. Ballasts: 5% of each type and rating installed. Furnish at least one of each type.
 - 5. Globes and Guards: 5% of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Lighting Fixture Schedule indicated on the drawings.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging, painted after fabrication.
- E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- F. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
 - 4. Laminated Silver Metallized Film: 90 percent.
- G. Plastic Diffusers, Covers, and Globes:
 - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - a. Lens Thickness: At least 0.125 inch minimum unless different thickness is indicated.
 - b. UV stabilized.
 - 2. Glass: Annealed crystal glass, unless otherwise indicated.

2.3 LED FIXTURES (other than Exit Signs)

- A. Fixtures shall be manufactured and assembled in the United States and meets the buy American requirements within the American Recovery and Reinvestment Act and be UL Listed.
- B. Light Emitting Diodes shall be manufactured by Cree, Lumiled, or Nachia; no approved equal.

- C. Drivers shall be manufactured by Osram/Sylvania, Phillips/Advance, or ADL Technology and be capable of accepting the voltage indicated on the drawings and capable of dimming if required. The driver shall meet the following requirements:
 - 1. Class A Sound Rating
 - 2. Total Harmonic Distortion of less than 20 percent.
 - 3. Operating temperature between -40 degree Celsius and 40 degrees Celsius.
 - 4. Driver shall not contain any Polychlorinated Biphenyl (PCB).
- D. All LED fixtures shall be tested to IESNA LM-79-2008 and LM-80-2008 and meet the following:
 - 1. Fixture Efficacy (Lumens per watt): 60 or greater.
 - 2. Color Accuracy: Color Rendering Index (CRI): 70 or greater.
 - 3. Light Color: As indicated on lighting fixture schedule.
 - 4. Outdoor fixtures shall be IP65 Rated.
 - 5. LEDs, driver and all components shall have a system lifetime of 50,000 hours or more at 25 degrees Celsius.
 - 6. Fixture shall have a minimum of a five-year warranty on all components and finishes.

2.4 EXIT SIGNS

- A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 - 1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
- C. Self-Luminous Signs: Powered by tritium gas, with universal bracket for flush-ceiling, wall, or end mounting. Signs shall be guaranteed by manufacturer to maintain the minimum brightness requirements in UL 924 for 20 years.

2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- E. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

- F. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.
 - 1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches from lighting fixture corners.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
- C. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- E. Install lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation", NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.
- F. Provide fixtures and/or fixture outlet boxes with hangers to properly support fixture weight. Submit design of hangers, method of fastening, other than indicated or specified herein, for review by Architect.
- G. Install flush mounted fixtures to eliminate light leakage between fixture frame and finished surface.
- H. Fasten fixtures securely to indicated structural supports; and ensure that pendant fixtures are plumb and level. Provide individually mounted pendant fixtures longer than 2 feet with twin stem hangers. Provide stem hanger with ball aligners and provisions for minimum 1" vertical adjustment. Mount continuous rows of fixtures with an additional stem hanger greater than number of fixtures in the row.

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- I. 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 and B, and the National Electrical Code.
- J. Support surface mounted fixtures greater than 2 feet in length at a point in addition to the outlet box fixture stud.
- K. Suitable plaster rings or frames shall be provided for all recessed fixtures. Where sloping ceilings occur, all suspended fixtures shall be mounted at the same height above the floor, except where directed otherwise by the Architect. Where fixtures or boxes are recessed in special construction, the Contractor shall do all cutting required at each location. The Contractor shall reinforce openings with suitable structural members as required by the Architect.
- L. The Electrical Contractor shall be responsible for notifying the General Contractor of exact locations where recessed fixtures and boxes will be installed. It will be necessary to coordinate the exact locations of structural members to provide clearance for the recessed electrical equipment.
- M. Recessed fluorescent fixtures shall be supported independently of T-bars furnished as a part of the General Contractor's ceiling construction. Fixtures shall be fastened to the T-bars in accordance with the requirements of the National Electrical Code. The approximate locations and arrangement of fixtures shall be as shown on the drawings. All work shall be properly coordinated with the General Contractor. Locations, dimensions, weights, etc., shall be given to the General Contractor prior to the installation. The Electrical Contractor shall be responsible for furnishing fixtures with accessories compatible for installation in the ceilings being installed. The exact type of ceiling to be installed and details of construction shall be obtained from the General Contractor. The fixture installation shall also be coordinated with piping, diffusers, grilles and ductwork which will be installed under other Contracts. Although fixtures are specified with Type G or F trim and accessories, special trim and mounting accessories shall be used where necessary to obtain the closest coordination and compatibility with the ceilings furnished.
- N. All lighting fixtures shall be rigidly supported from main building construction slabs or structural members. The arrangement and type of supports shall be subject to the approval of the Architect. Supports shall be made up of steel members, steel rods or steel straps.
- O. The Electrical Contractor shall space all lighting fixtures evenly on centers or joints of ceiling tiles or other construction. Fixtures shall be located at center of ceiling tiles where possible. All lighting fixtures and associated boxes shall also be coordinated with ductwork, diffusers and grilles installed under the Heating Contract.
- P. Fixtures shall be designed, arranged and furnished and installed complete with all accessories for mounting in or on plaster, acoustical tile construction, T-bar type construction, and other types of ceilings shown on the Architectural Drawings. The Contractor shall check carefully with final ceiling finish schedule of rooms before ordering fixtures for he will be held responsible for the installation complete in every detail. All work shall be coordinated with the General Contractor.

- Q. It is the Electrical Contractor's responsibility to scale the drawings and count the actual number of fixtures which must be furnished and installed under this Contract. Refer to architectural drawings for exact dimensions of fixture location.
- R. Where the building insulation is penetrated by boxes, fixtures, conduits, etc., under this Contract, the Contractor shall repair the insulation and vapor barrier jacket on the insulation, and shall seal all edges to assure a moisture tight installation.
- S. Where smoke walls, fire barriers and fire rated ceilings, and floors are penetrated by boxes, fixtures, conduits, etc., under this Contract, the Contractor shall seal all openings and shall provide all noncombustible materials and coverings as required to conform with the requirements of the National Fire Protection Association.
- T. Boxes on prewired fixtures shall not be used for through-circuit wiring, except where the fixtures are specifically UL approved for that purpose.
- U. All inoperable lamps shall be replaced with new lamps during the course of construction, up to and including the date of final acceptance of the building by the Architect.
- V. Ballasts shall be housed within the same lighting fixture enclosure as the lamps for which they control. Ballasts are not being permitted to control more than two lamps. Three and four lamp ballasts are prohibited.
- W. Lighting fixtures voltages shall be identified at the ballast or at the location of the electrical connection to the manufacturer's internal wiring connection. Labels shall be Panduit pressure sensitive type approved by the Owner.

3.2 CONNECTIONS

- A. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.
- C. Replace defective and burned out lamps for a period of one year following the date of final acceptance by the Owner.

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- D. At date of final acceptance by the Owner, replace lamps in lighting fixtures which are observed to be noticeably dimmed after Contractor's use and testing, as judged by Architect.

3.4 CLEANING AND ADJUSTING

- A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.
- B. Adjust aimable fixtures to provide required light intensities.
- C. Clean lighting fixtures of dirt and construction debris upon completion of installation. Clean fingerprints and smudges from lenses.
- D. Protect installed fixtures from damage during remainder of construction period.

3.5 DEMONSTRATION

- A. Upon completion of installation of lighting fixtures, and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

3.6 LIGHTING FIXTURE SCHEDULE

- A. The lighting fixture schedule is indicated on the drawings.

END OF SECTION 265100

SECTION 271300 - COMMUNICATIONS CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Data communications cabling.
 - 2. Fire stopping.
 - 3. Interior Communication Pathways requirements.

1.3 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor and material necessary for a complete data system
- B. The Contractor shall furnish and install all cabling, connectors and all appurtenances required for a complete voice and data distribution systems and as indicated on the Contract Documents.
- C. All cabling types, manufacturers, connection types, installation hardware, etc. contained in this specification are to be provided as specified without substitution. This is in keeping with the standardization of this type of product and system that is already in place and thoroughly tested throughout the CCAC campus system.

1.4 CODE AND STANDARDS COMPLIANCE

- A. Design, manufacture, test, and install telecommunications cabling networks per manufacturer's requirements and in accordance with NFPA-70 (National Electrical Code(r)), state codes, local codes, requirements of authorities having jurisdiction and particularly the following standards:
 - 1. ANSI/TIA/EIA-568B.1 (Annexes A-E) -- Commercial Building Telecommunications Cabling
 - 2. ANSI/TIA/EIA-568B.2 – Balanced Twisted Pair Cabling Components (Includes TIA854 1000 BaseTX)ANSI/TIA/EIA-568B.3 – Optical Fiber Cabling Components.
 - 3. ANSI/TIA/EIA-569-A (Addenda 1-6) -- Commercial Building Standard for Telecommunications Pathways and Spaces
 - 4. ANSI/TIA/EIA-606-A -- The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

5. ANSI/TIA/EIA-607-A -- Commercial Building Grounding and Bonding Requirements for Telecommunications.
6. ANSI/TIA/EIA-758 – Customer Owned Outside Plant
7. NFPA Part 70 (NEC)
8. Install cabling in accordance with the most recent edition of BICSI publications:
 - a. BICSI -- Telecommunications Distribution Methods Manual
 - b. BICSI -- Cabling Installation Manual
9. Contractor Qualifications.
 - a. Contractors must have experience installing voice and data lines using Cat 6A cabling with Hubbell connectors.
 - b. Contractors must be Hubbell Premise Wiring certified and are to include documentation from Hubbell indicating such with the bid.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Voice and data lines using Cat 6A plenum cabling with Hubbell connectors.
- B. Velcro is the only acceptable cable tie wrap. Location where tie wrap is acceptable is in all concealed locations.
- C. All cabling is to be tested with a Certification Level testing unit from a major manufacturer including Fluke and/or Ideal to verify Cat 6A compliance and documentation of these tests provided to CCAC.
- D. Contractor must label each new cable at the faceplate and patch panel using the CCAC adopted labeling schematic.
- E. All new cabling must come with a manufacturer's 25 year warranty on all inside cabling.
- F. All conduit installations shall conform to the requirements of specification section Raceways and Boxes.

2.2 STANDARDS

- A. The following materials must be utilized for any and all installation for this project:
 1. Cat 6a Horizontal Copper Cabling: General Cable GenSpeed 10 UTP 600MHZ (Blue for Data; Black for security; and White for Voice).
 2. Jacks: Hubbell Ascent Series Jacks Cat 6A (568B) (Blue for Data and White for Voice) HJ6AB; HJ6AW. Jacks at faceplates to match cable color (Blue for data; white for voice and black for cameras).

3. Patch Panels: Hubbell Nextspeed Cat 6A (HP6A48U-48 port).
4. Faceplates: Hubbell IStation 6A Port (IFP - color and port count to be verified).
5. Racks: Hubbell NextFrame Rack w/6" Z Channels Vertical Managers (CS1976).
6. Horizontal Cable Manager: Hubbell HC219CE6N.
7. Modular Patch Cords: Hubbell Nextspeed Ascent Cat 6A (Blue data; White for voice) (HC6Axx)

2.3 FIRE STOPPING

- A. New and existing raceways, cable trays, and cables for power, data, and communications systems penetrating non-rated and fire-rated floors, walls, and other partitions of building construction shall be fire stopped where they penetrate new or existing building construction. All penetrations from abandoned cabling and new cabling shall be fire stopped. This includes drywall penetrations to fishable walls.
- B. All fire stops shall be installed in accordance with the manufacturer's instructions in order to maintain the specific rating assigned by the independent testing laboratory.
- C. Existing raceways, cable trays, conduits, sleeves, and cabling that penetrate existing building construction shall be fire stopped to the extent necessary to fill cavities that may exist between existing building construction and existing communications penetrations or existing conduit sleeve, and between existing conduits and existing conduit sleeve.
- D. If in the process of construction, it is necessary to cut through a smoke barrier, CCAC facilities personnel shall be notified, and the passage shall be sealed according to local fire codes.

2.4 COMMUNICATIONS EQUIPMENT ROOMS

- A. Patch Panels - The patch panels in the TRs shall be marked and labeled by the Contractor so that each voice and data cable can be associated with a specific RJ-45 at a specific workstation. Handwritten labels are unacceptable.
- B. Rooms will require $\frac{3}{4}$ inch plywood sheets placed on the walls for mounting equipment. Cable tray will be installed in the rooms to allow access from the backboards to the 4-inch sleeves and the cable tray, which leaves the room.
- C. Tie Wraps
 1. Cable ties used to bundle cables should be applied loosely to allow the cable tie to slide around the cable bundle. The cable ties should not be cinched so tightly as to deform the cable sheath. Cable placement should not deform the cable sheath. Only Velcro tie wraps are acceptable. All Velcro tie wraps used outside of the Telecommunications Rooms shall be plenum rated.
 2. Contractor must place all new cables in with existing Velcro wrapped cable bundles in the cable tray. Cables must be placed neatly in the vertical wire managers and Velcro wrapped.
 3. Only Velcro tie wraps are acceptable.

D. Copper Patch Cords

1. The Contractor shall supply data patch cords with factory assembled plug- ended jumpers for patch panel terminal blocks and station connections. The patch cords shall have built-in exclusion features to prevent accidental polarity reversals and split pairs.

2.5 INTERIOR COMMUNICATION PATHWAYS

A. Conduit

1. The Contractor shall not exceed conduit runs of 100 feet without using appropriately sized pull boxes between sections. LB and LM fittings will not be used in place of pull boxes.
2. The Contractor shall be responsible for determining if conduits are required for the installation of cable in a building. At a minimum the Contractor shall install cable in EMT conduit in exposed areas. For above ceiling installations the Contractor will be responsible for meeting the fire code requirements for internal building conduits. The conduits shall be manufactured in accordance with U.L. standards and conform to the requirements of All Applicable Codes and Standards.
3. Non-Metallic Surface Raceways - Contractor shall quote raceway, Hubbell Media Track or as noted on drawings.

B. Cable Support

1. Provide support for all cable under this project.
2. Minimum support (concealed areas) – J hooks – maximum spacing not to exceed cable manufacture recommendation – maximum 48 inches.
3. Cable trays and raceways as shown on drawings – provide wiremold products to match existing construction unless noted otherwise.
4. Tie wraps prohibited.

PART 3 - EXECUTION

3.1 APPLICABLE TESTING STANDARDS

A. Testing shall be in accordance with the following standards:

1. ASTM D 4566-94, Standard Test Method for Electrical Performance Properties of Insulation and Jackets for Telecommunications Wire and Cable, 1994
2. ANSI/TIA/EIA-568-A, Commercial Building Telecommunications Standard, 1995.
3. ANSI/TIA/EIA-568-A-1, Propagation Delay and Delay Skew Specifications for 100 Ω 4-pair cable, 1997
4. ANSI/TIA/EIA-568-A-2, Corrections and Additions to TIA/EIA-568-A, 1998
5. ANSI/TIA/EIA-568-A-5, Transmission Performance Specifications for 4- pair 100 Ω

B. Testing Category 6A

1. Test results shall include a record of test frequencies, cable type, conductor pair and cable (or Outlet) I.D., measurement direction, test equipment type, model, serial number, date, reference setup and crew member name(s).
2. Printouts generated for each cable by the wire (or fiber) test will be submitted as part of the documentation package. The Contractor will also furnish this information in electronic form via email (or physical media) to CCAC's designated representative. These media shall contain the electronic equivalent of the test results as defined by the bid specification and be of a format readable from Microsoft Word. Alternately, the Contractor shall provide a licensed copy of the software required to view and print the data. The Contractor shall furnish 1 copy of the data and display (if applicable) software.

C. Labeling

1. The punch-down blocks and patch panels in the TRs shall be marked and labeled by the Contractor so that each voice and data cable can be associated with a specific RJ-45 at a specific workstation. Patch panels shall also be labeled V1, V2, D1, D2, etc. Hand written labels are unacceptable. The prints supply the acceptable wiring labeling scheme. All faceplate labels shall be on paper labels with clear covers. All labels on Cat-6 patch panels shall not cover the patch panel port numbers. All copper riser Cat-6A patch panels shall be labeled by house pairs. House pair labels shall cover port numbers on the patch panels.

Faceplate Example

FP# - Port# - TR - Panel# - Port#

1-2-B209-V2-28

TR Example (same cable)

Room - FP# - Outlet#

B104-1-2

3.2 IMPLEMENTATION

- A. The Contractor shall test the entire system operation and shall certify in writing that the system has been thoroughly tested by the Contractor and is ready for implementation. The Owner reserves the right to have a representative present for all testing and/or to verify the results of all tests.
- B. Upon successful implementation the Contractor shall:
 1. Immediately correct any problems and complete any installation tasks outstanding.
 2. Re-route any temporary cable.
 3. Install blank faceplates on abandoned cable locations.
 4. Alternatively, supply a bid to remove all abandoned cabling.
 5. The Contractor agrees to provide two (2) sets of Product bay-face and equipment room drawings in .dwg/.dxf file format prior to CCAC's Final Acceptance of the products.

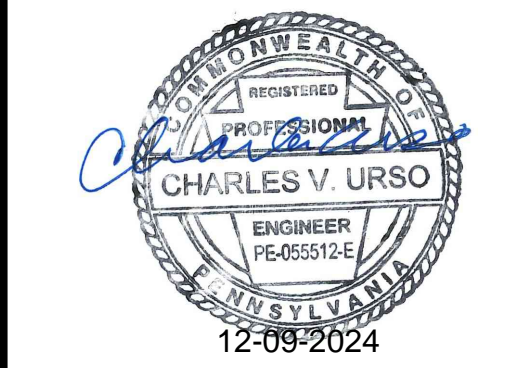
3.3 SUPPORT & WARRANTY

- A. Support - Contractor will include in the bid response, a copy of the support contract that will be issued between the Contractor and the Owner. Owner reserves the right to request changes to the contract before it is signed and implemented by the two parties.
- B. Warranty Data - Contractor is to provide the Owner with information concerning warranty coverage for all materials being purchased as part of this implementation and a copy of the manufacturer's warranty verified and signed by the Contractor. Contractor is to elaborate on how the manufacturer's warranty program works. A 25- year warranty is required.

END OF SECTION 271300

Consultants:

Seal:



Seal:

Project Identification:

**COMMUNITY COLLEGE
OF ALLEGHENY
COUNTY
BOYCE CAMPUS**

**EGRESS LIGHTING
MODIFICATIONS**

**506 BEATTY ROAD
MONROEVILLE, PA
15146-1348**

No.: Date: Description:

Sheet Title:
COVER SHEET

Project No.: 2023-2010.01

Cadd Drawing File: 2310-CS000.dwg

Drawn By: SNM/AJP

Checked By: CVU

Date: 12/18/2024

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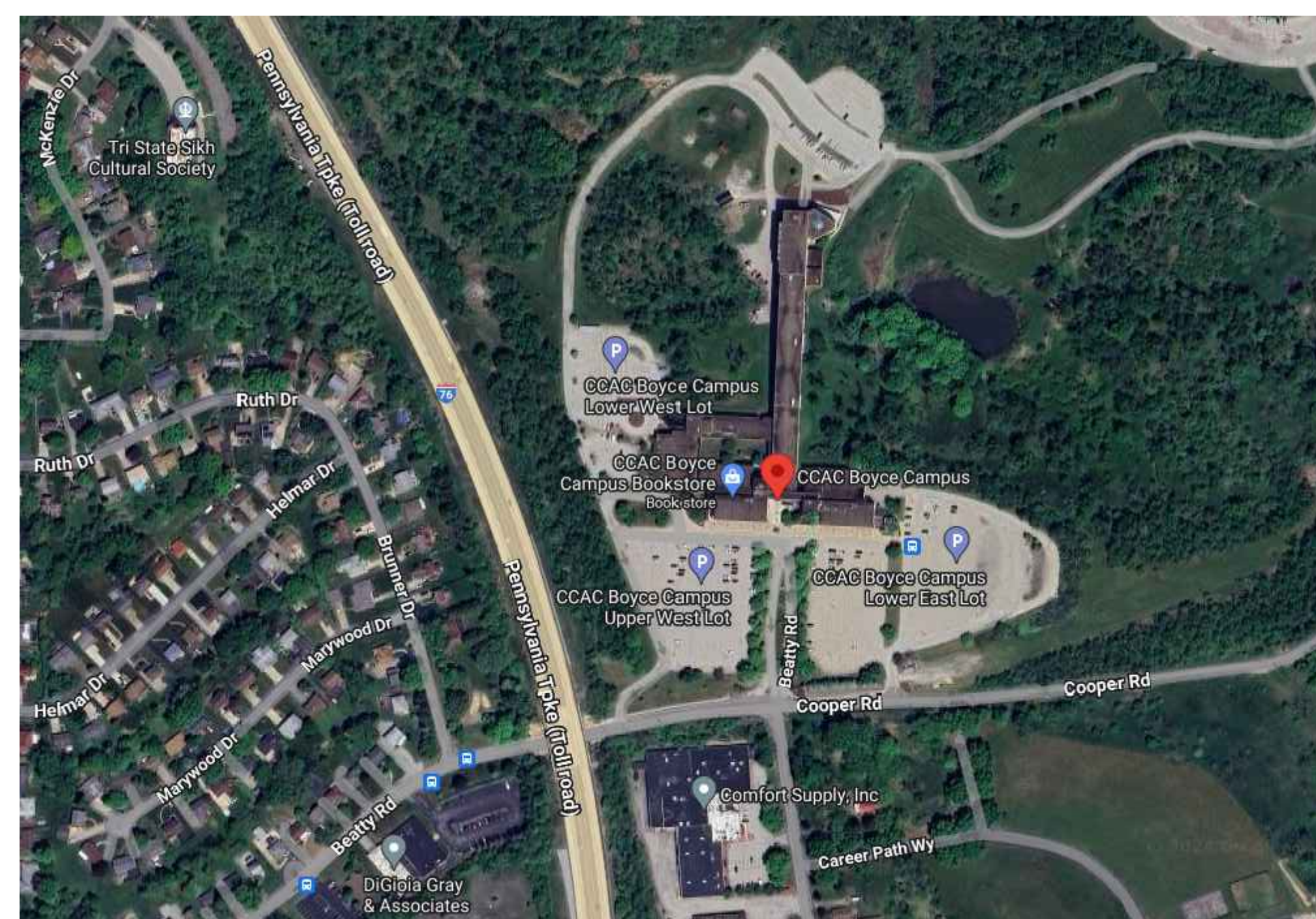
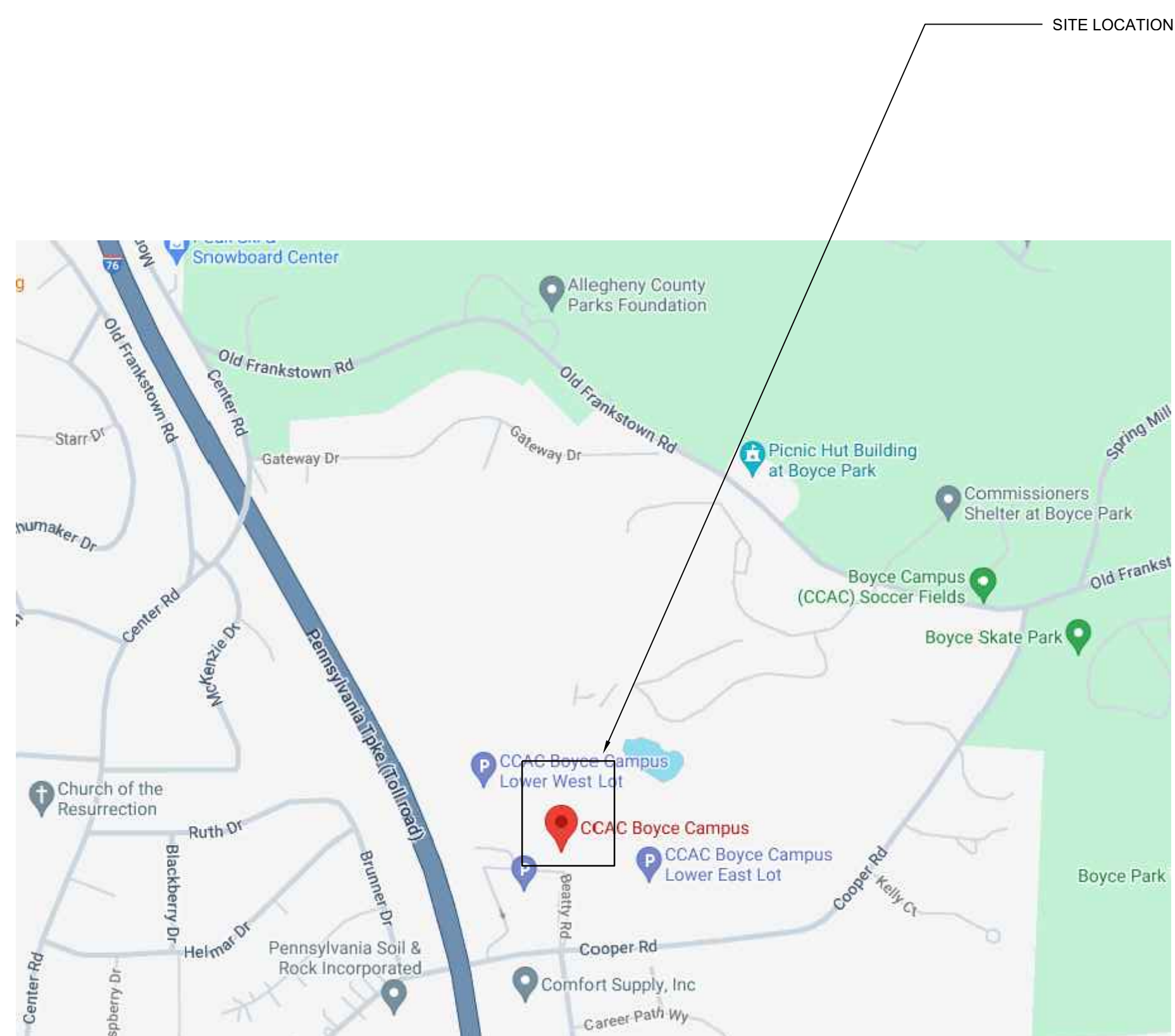
Drawing Number

CS.01

Sheet 1 of 24



CCAC BOYCE CAMPUS EGRESS LIGHTING MODIFICATIONS
506 BEATTY ROAD MONROEVILLE, PA 15146



| SHEET NUMBER | SHEET NAME | PERMIT SET - 12.18.2024 |
|--------------|---|-------------------------|
| CS000 | COVER SHEET | X |
| E.0.01 | SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES | X |
| E.0.02 | ELECTRICAL FIXTURE SCHEDULE | X |
| EL.1.1 | FIRST FLOOR PLAN | X |
| EL.1.2 | SECOND FLOOR PLAN | X |
| EL.1.3 | THIRD FLOOR PLAN PART 1 | X |
| EL.1.4 | THIRD FLOOR PLAN PART 2 | X |
| EL.1.5 | FOURTH FLOOR PLAN PART 1 | X |
| EL.1.6 | FOURTH FLOOR PLAN PART 2 | X |
| EL.1.7 | FOURTH FLOOR PLAN PART 3 | X |
| EL.1.8 | FOURTH FLOOR PLAN PART 4 | X |
| EL.1.9 | FIFTH FLOOR PLAN PART 1 | X |
| EL.1.10 | FIFTH FLOOR PLAN PART 2 | X |
| EL.1.11 | FIFTH FLOOR PLAN PART 3 | X |
| EL.1.12 | SIXTH FLOOR PLAN PART 1 | X |
| EL.1.13 | SIXTH FLOOR PLAN PART 2 | X |
| E.5.1 | POWER RISER 1 | X |
| E.5.2 | POWER RISER 2 | X |
| E.5.3 | POWER RISER 3 | X |
| E.6.1 | ELECTRICAL DETAILS | X |
| E.6.2 | ELECTRICAL DETAILS | X |
| E.6.3 | ELECTRICAL DETAILS | X |
| E.7.1 | ELECTRICAL PANEL SCHEDULES | X |
| E.7.2 | ELECTRICAL PANEL SCHEDULES | X |

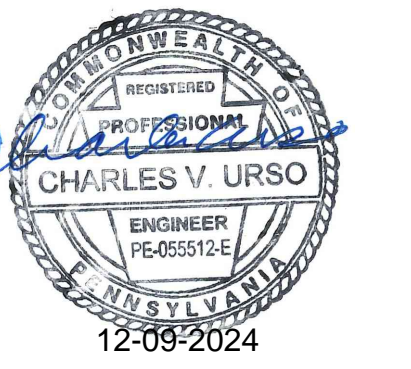
PERMIT SET - 12/18/2024

| LIGHTING FIXTURE SCHEDULE | | | | | | | |
|---------------------------|---|---------------|--|----------|-------------------------------|----------------------|---|
| SYMBOL | DESCRIPTION | MANUFACTURER | CATALOG NUMBER | VOLTAGE | LAMPS | MOUNTING | NOTES |
| RF1 | 2 X 4 SHALLOW PLENUM TROFFER WIRELESS CONTROL - SIEMENS ENLIGHTED - COLD ROLLED STEEL - POST PAINTED WHITE | H.E. WILLIAMS | PT-24-L49/840-RA-(L44)-DIM-UNV | 120/277V | 32W LED 3500K 4900lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED -ENLIGHTED SUSXX/CU-4E-FMH WITH SUPPLIED CABLING TO SENSOR |
| RF2 | 2 X 2 SHALLOW PLENUM TROFFER WIRELESS CONTROL - SIEMENS ENLIGHTED - COLD ROLLED STEEL - POST PAINTED WHITE | H.E. WILLIAMS | PT-22-L43/840-RA-(L40)-DIM-UNV | 120/277V | 30W LED 3500K, 4300lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED -ENLIGHTED SUSXX/CU-4E-FMH WITH SUPPLIED CABLING TO SENSOR |
| P1 | SLIM HIGH BAY HIGH OUTPUT LED DIE FORMED ALUMINUM HOUSING POST PAINT - WIRE GUARD | H.E. WILLIAMS | GS-2-L120-8-35-CA-WG11 F8&UNV | 120/277V | 85W LED 3500K, 12000lm | RECESSED | PROVIDE CHAIN MOUNTING FROM STRUCTURE |
| DL1 | SHALLOW PLENUM RATED LED DOWNLIGHT, 4.5" DIAMETER CLEAR SEMI SPECULAR REFLECTOR | H.E. WILLIAMS | 4PR-TL-L15-8-35-DIM-UNV TRIM - L-W-OF-CS | 120/277V | 17W, LED 3500K, 4300lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| DL2 | SHALLOW PLENUM RATED LED DOWNLIGHT, 4.5" DIAMETER WET LOCATION LISTED | H.E. WILLIAMS | 4PR-TL-L15-8-35-DIM-UNV TRIM - L-W-OF-CS-WET/CC | 120/277V | 17W, LED 3500K, 4300lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| DL3 | LED DOWNLIGHT, 6" DIAMETER, SLOPED ADAPTER RATED CLEAR SEMI SPECULAR REFLECTOR WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 6DR-L10-8-35-DIM-UNV TRIM - O-W-OF-CS-MWT | 120/277 | 9W, LED 3500K, 1000lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| DL4 | LED DOWNLIGHT, 12" DIAMETER, WHITE FINISH WIRELESS CONTROL - SIEMENS ENLIGHTED | BRUCK | JAZZ-S-RD-12-D-500-35-90-WH-UNV-DIM10 | 120/277 | 6W, LED 3500K, 550lm | SURFACE | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| DL5 | LED DOWNLIGHT, 8" DIAMETER, SLOPED ADAPTER RATED CLEAR SEMI SPECULAR REFLECTOR WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 8DR-L20-8-35-DIM-UNV TRIM - O-W-CS-MWT | 120/277 | 24W, LED 3500K, 2000lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| DL6 | LED DOWNLIGHT, 4" DIAMETER CLEAR SEMI SPECULAR REFLECTOR WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 4DR-L8-8-35-DIM-UNV | 120/277 | 9W, LED 3500K, 1000lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| DL7 | LED DOWNLIGHT, 4.5" DIAMETER, SLOPED ADAPTER RATED CLEAR SEMI SPECULAR REFLECTOR WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 4DR-TL-L10-8-35-DIM-UNV TRIM - O-W-OF-CS-MWT | 120/277 | 9W, LED 3500K, 1000lm | RECESSED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| SF1 | SURFACE - WALL MOUNTED LINEAR LED, 24" COLD ROLLED STEEL CONSTRUCTION WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | SLF-2-L26-8-35-HIA-UNV | 120/277 | 21.3W, LED 3500K 2600lm | SURFACE | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| SF2 | SURFACE MOUNTED LINEAR LED, 4FT STRIP COLD ROLLED STEEL CONSTRUCTION WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 76R-4-L30-8-35-DIM-UNV | 120/277 | 20W, LED 3500K, 3000lm | SURFACE | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| SF3 | SURFACE MOUNTED LINEAR LED, 2FT STRIP COLD ROLLED STEEL CONSTRUCTION WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 75R-4-L30-8-35-DIM-UNV | 120/277 | 20W, LED 3500K, 3000lm | SURFACE SUSPENDED | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| SF4 | SURFACE MOUNTED LINEAR LED, 4FT, ENCLOSED INDUSTRIAL LIGHT CLOSED-CELL POLYURETHANE GASKET WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | 96-4-L40-8-35-HIAFR-WET/1-DIM-UNV | 120/277 | 30W, LED 3500K, 4000lm | SURFACE | WET LISTED W.T. HUB WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| SL1 | SURFACE MOUNTED LINEAR LED, 4FT COVE LIGHT EXTRUDED ALUMINUM CONSTRUCTION WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | SL-S-4-L3-8-35-RD-SM-PC10-DIM-UNV | 120/277 | 3W, LED 3500K, 300lm | SURFACE | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| WL1 | WALL MOUNTED LINEAR LED, 4FT COLD ROLLED STEEL CONSTRUCTION WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | WMAUD-4-L40-835U-835D-AF-DIM/UDIM-UNV | 120/277 | 65W, LED 3500K, 4000lm | SURFACE | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| WP1 | DIE CAST ALUMINUM ARCHITECTURAL WALL PACK - DARK BRONZE - PHOTO CELL | H.E. WILLIAMS | VWM-L17-730-DBZ-SDGL-PC-UNV | 120/277 | 16W, LED 3000K 1700lm | SURFACE | PROVIDE PHOTOCELL |
| EX1 | POLYCARB EXIT SIGN - NICKEL METAL HYDRIDE BATTERY WHITE WITH RED LETTERS SINGLE FACE - UNIVERSAL MOUNT KIT | LUMINATION | LUXAR | 120/277 | 2W, LED | UNIVERSAL | |
| EX2 | POLYCARB EXIT SIGN - NICKEL METAL HYDRIDE BATTERY WHITE WITH RED LETTERS DUAL FACE - UNIVERSAL MOUNT KIT | LUMINATION | LUXAR | 120/277 | 2W, LED | UNIVERSAL | |
| BP1 | BATTERY PACK - WET LOCATION NICKEL METAL HYDRIDE BATTERY DUAL VOLTAGE - 10 YEAR LIFE - POLYCARB GRAY | LUMINATION | LUMELWG | 120/277 | 3W, LED | SURFACE | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |
| VG1 | 13" GARAGE LED PENDANT LIGHT TWO-PIECE HINGED DIE CAST ALUMINUM ENCLOSURE WIRELESS CONTROL - SIEMENS ENLIGHTED | H.E. WILLIAMS | VG1-L30-8-30-T5-PM-WHT-DIM-120 | 120/277 | 36W, LED 3000K 3566lm | UNIVERSAL | WITH ENLIGHTED CONTROL PACKAGE FACTORY INSTALLED |

- ALTHOUGH FIXTURES ARE SPECIFIED WITH TRIM ACCESSORIES, SPECIAL TRIM AND MOUNTING ACCESSORIES SHALL BE USED WHERE NECESSARY TO OBTAIN THE CLOSEST COORDINATION AND COMPATIBILITY WITH CEILINGS FURNISHED. FIXTURES SHALL BE DESIGNED, ARRANGED, FURNISHED AND INSTALLED COMPLETE WITH ALL ACCESSORIES FOR MOUNTING IN OR ON PLASTER, ACOUSTICAL TILE CONSTRUCTION, T-BAR TYPE CONSTRUCTION, AND OTHER TYPES OF CEILINGS.
- NOT USED.
- NOT USED.
- LIGHTING FIXTURES SHALL BE FURNISHED WITH MULTI VOLT DRIVERS, 120V-277V CAPABLE DRIVERS.
- COLOR AND FINISH OF ALL LIGHTING FIXTURES AND COMPONENTS SHALL BE VERIFIED WITH ENGINEER.
- ALL FIXTURES SHALL BE PAINTED AFTER FABRICATION.

Consultants:

Seal:



Seal:

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**COMMUNITY COLLEGE
OF ALLEGHENY
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BOYCE CAMPUS**

**EGRESS LIGHTING
MODIFICATIONS**

**506 BEATTY ROAD
MONROEVILLE, PA
15146-1348**

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Sheet Title:
**ELECTRICAL LIGHTING
FIXTURE SCHEDULE**

Project No.: 2023-2010.01

Cadd Drawing File: 2010-EL-DP-0_2.dwg

Drawn By: SNMAJP

Checked By: CVU

Date: 12/18/2024

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GENERAL NOTES THIS SHEET:

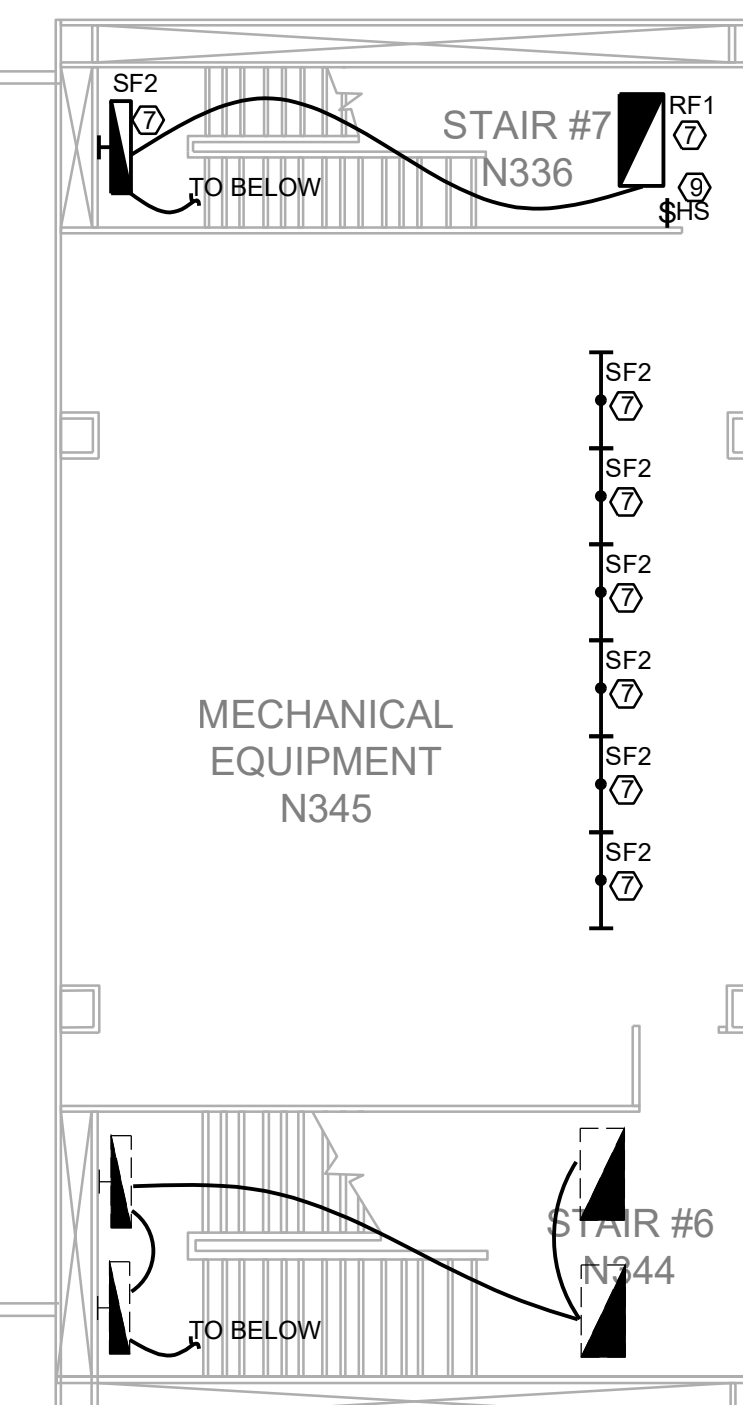
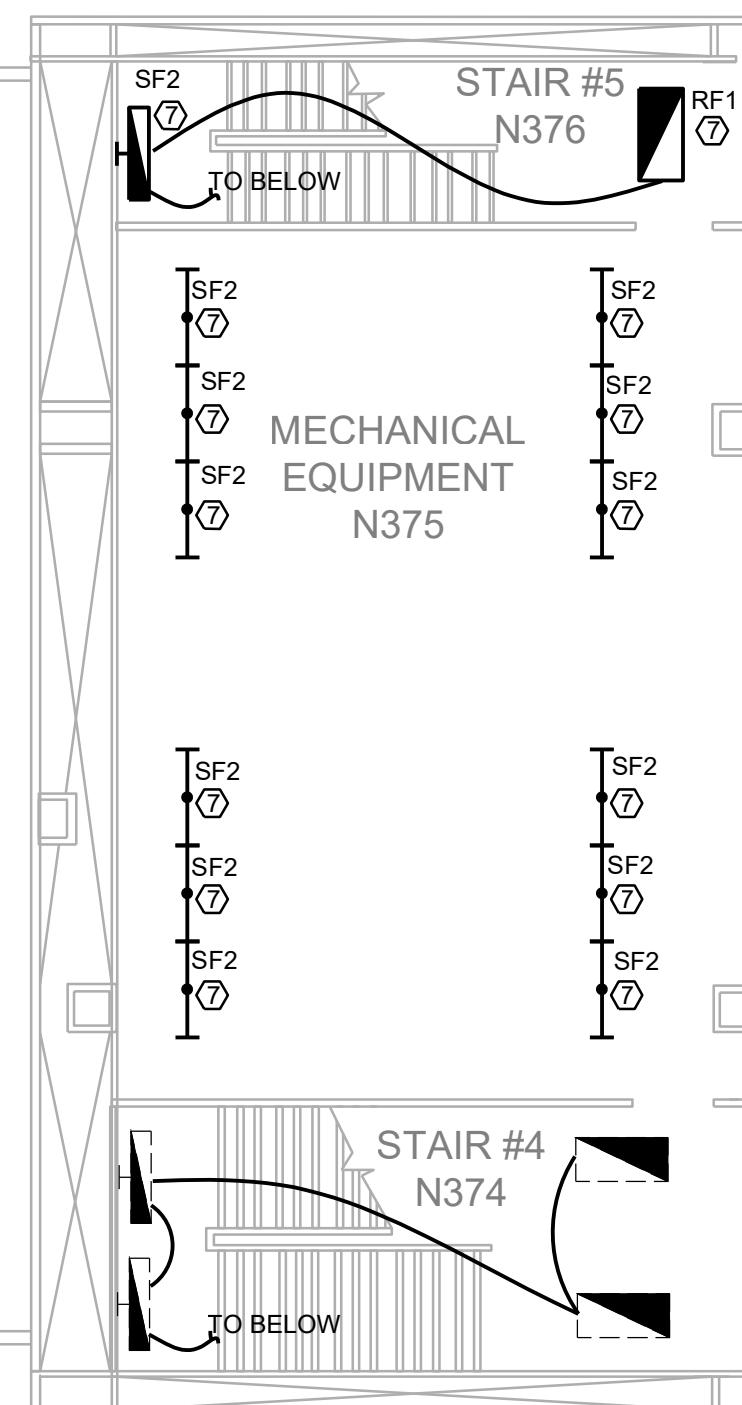
- ALL DRAWINGS ARE DERIVED FROM EXISTING NON-CAD PDF'S, THEREFORE THE SCALE IS APPROXIMATE.
- EC SHALL INSTALL ENLIGHTED TRANSFER DEVICE FOR ALL EGRESS CIRCUITS EXCEPT STAIRWELLS AND EXTERIOR CIRCUITS. EC SHALL INTERCEPT LOCAL NORMAL LIGHTING CIRCUIT (TYPICALLY 277VAC) AND CONNECT CIRCUIT TO TRANSFER DEVICE - EC SHALL CIRCUIT EMERGENCY PORTION OF TRANSFER DEVICE TO LOCAL GENERATOR SUPPORTED CIRCUIT (TYPICALLY 120VAC EXCEPT WEST WING - SEE PLAN SHEETS). THE LIGHTS IDENTIFIED AS EGRESS SHALL BE POWERED BY THE LOCAL NORMAL CIRCUIT (GENERALLY NOT SHOWN ON DRAWINGS) UNDER STANDARD OCCUPANCY CONDITIONS AND POWERED BY GENERATOR UNDER LOSS OF NORMAL POWER - BY USE OF THE ENLIGHTED TRANSFER DEVICE. THESE LIGHTING FIXTURES SHALL BE PROGRAMMED TO FULL BRIGHTNESS AND NOT REQUIRE AN OCCUPANT TO ACTIVATE THE OCCUPANCY SENSOR (THESE FIXTURES SHALL TURN ON FULL UNTIL SUCH TIME AS NORMAL POWER IS RESTORED). CONTRACTOR TO FIELD VERIFY FIXTURES EXACT LOCATION AND MOUNTING TYPE.

KEYNOTES THIS DRAWING:

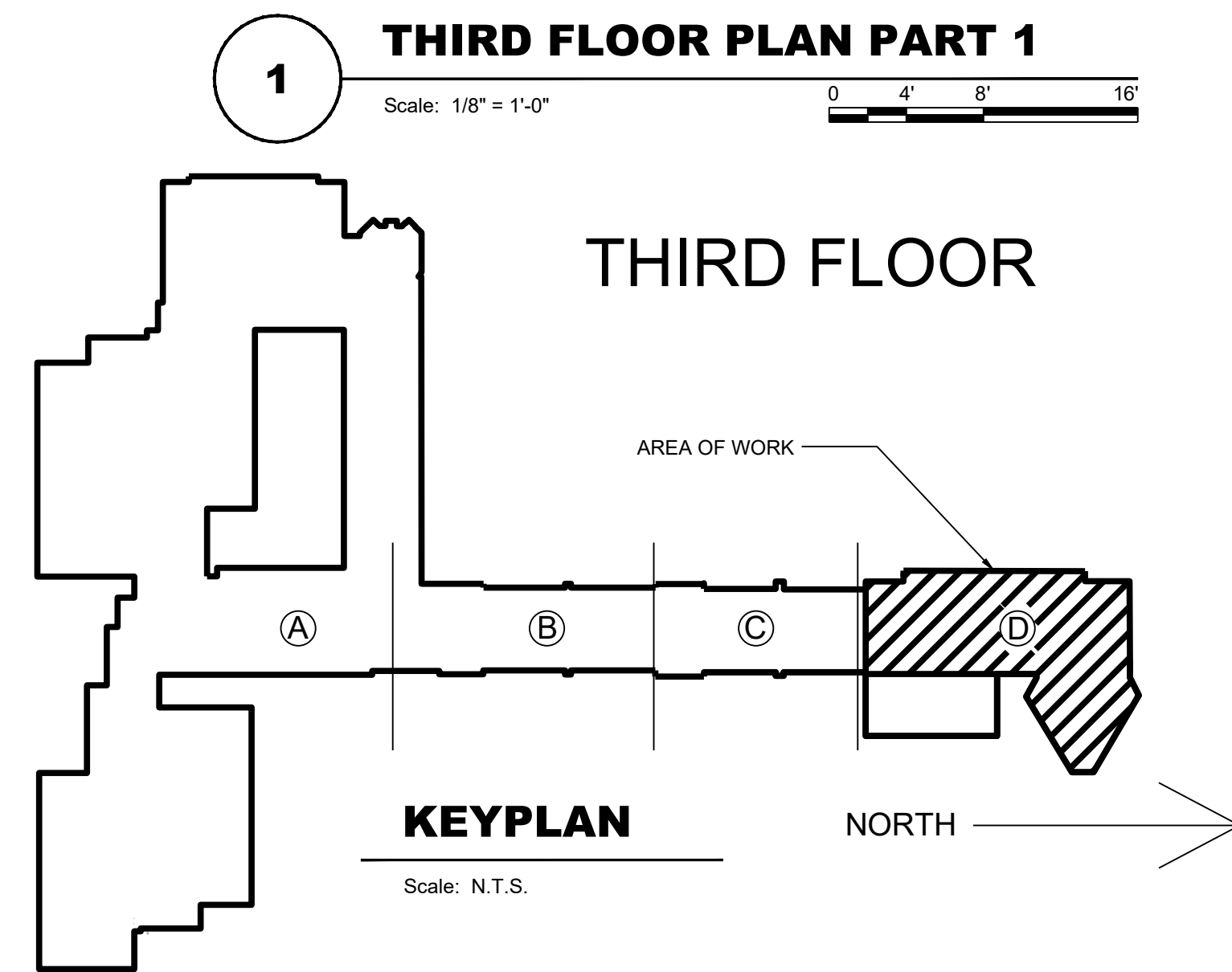
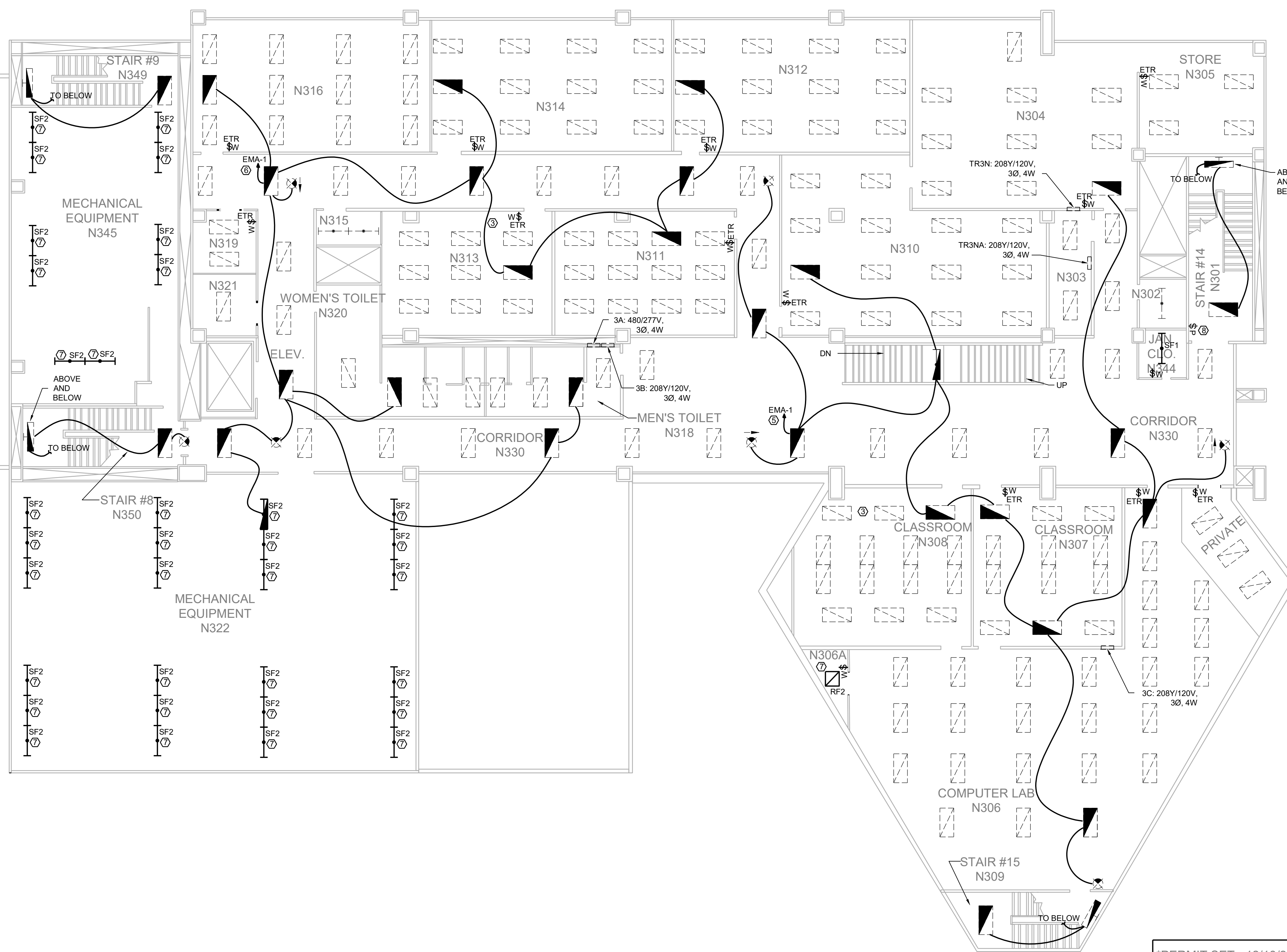
- REMOVE PITTSBURGH SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER, EGRESS CIRCUIT SHALL BE MAINTAINED VIA TRANSFER DEVICE.
- WIRELESS SWITCH (E.C. SHALL PROGRAM)
- E.C. SHALL PROGRAM ROOM LIGHTS
- CIRCUIT ON LOCAL LIGHTING CIRCUIT AHEAD OF SWITCH
- CIRCUIT TO E-ONLY BREAKER
- CIRCUIT TO LOCAL NORMAL CIRCUIT AND TO EMERGENCY CIRCUIT - PROVIDE ENLIGHTED TRANSFER DEVICE.
- REMOVE EXISTING FIXTURE - MAINTAIN AND REUSE CIRCUIT - PROVIDE MOUNTING ACCESSORIES AS REQUIRED
- REMOVE PITTSBURGH SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER, EGRESS CIRCUIT SHALL BE MAINTAINED.
- REMOVE SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER. EGRESS CIRCUIT SHALL BE MAINTAINED VIA TRANSFER DEVICE.

MATCH LINE ON EL. 1.4

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MATCH LINE ON SAME SHEET



H.F. LENZ
ENGINEERING
1407 Scalp Avenue
Johnstown, PA 15904
Phone: 814-269-9300
FAX: 814-269-9301
www.hflenz.com

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Seal:



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COMMUNITY COLLEGE OF ALLEGHENY COUNTY BOYCE CAMPUS
EGRESS LIGHTING MODIFICATIONS
506 BEATTY ROAD MONROEVILLE, PA 15146-1348

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Sheet Title:
THIRD FLOOR PLAN PART 1

Project No.: 2023-2010.01
Cadd Drawing File: 2010-EL-DP-1_3-1_4.dwg
Drawn By: SNMAJRP
Checked By: CVU
Date: 12/18/2024
Copyright: © 2023 H.F. LENZ COMPANY
Drawing Number

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**COMMUNITY COLLEGE
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BOYCE CAMPUS**

**EGRESS LIGHTING
MODIFICATIONS**

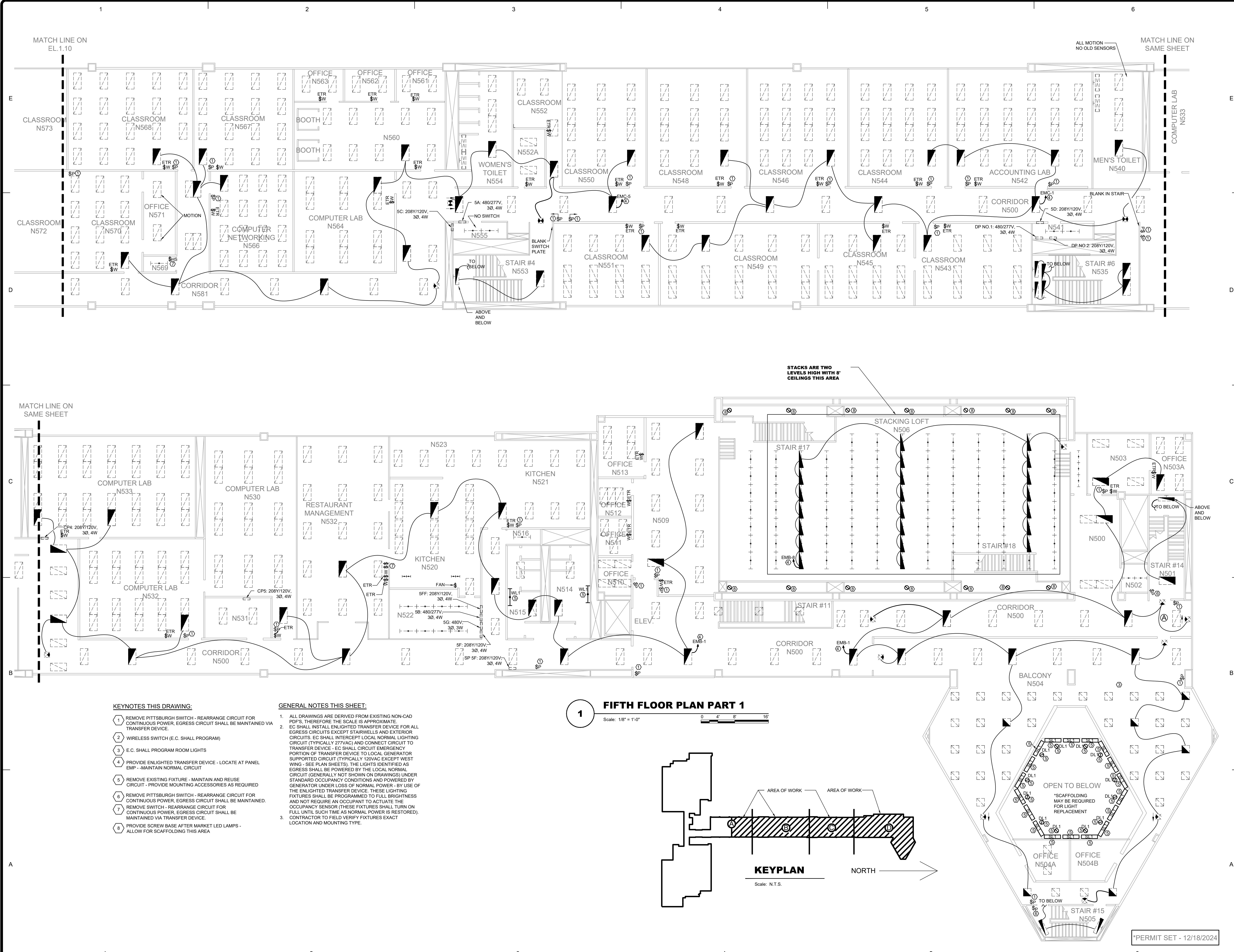
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Sheet Title:
**FIFTH FLOOR PLAN
PART 1**

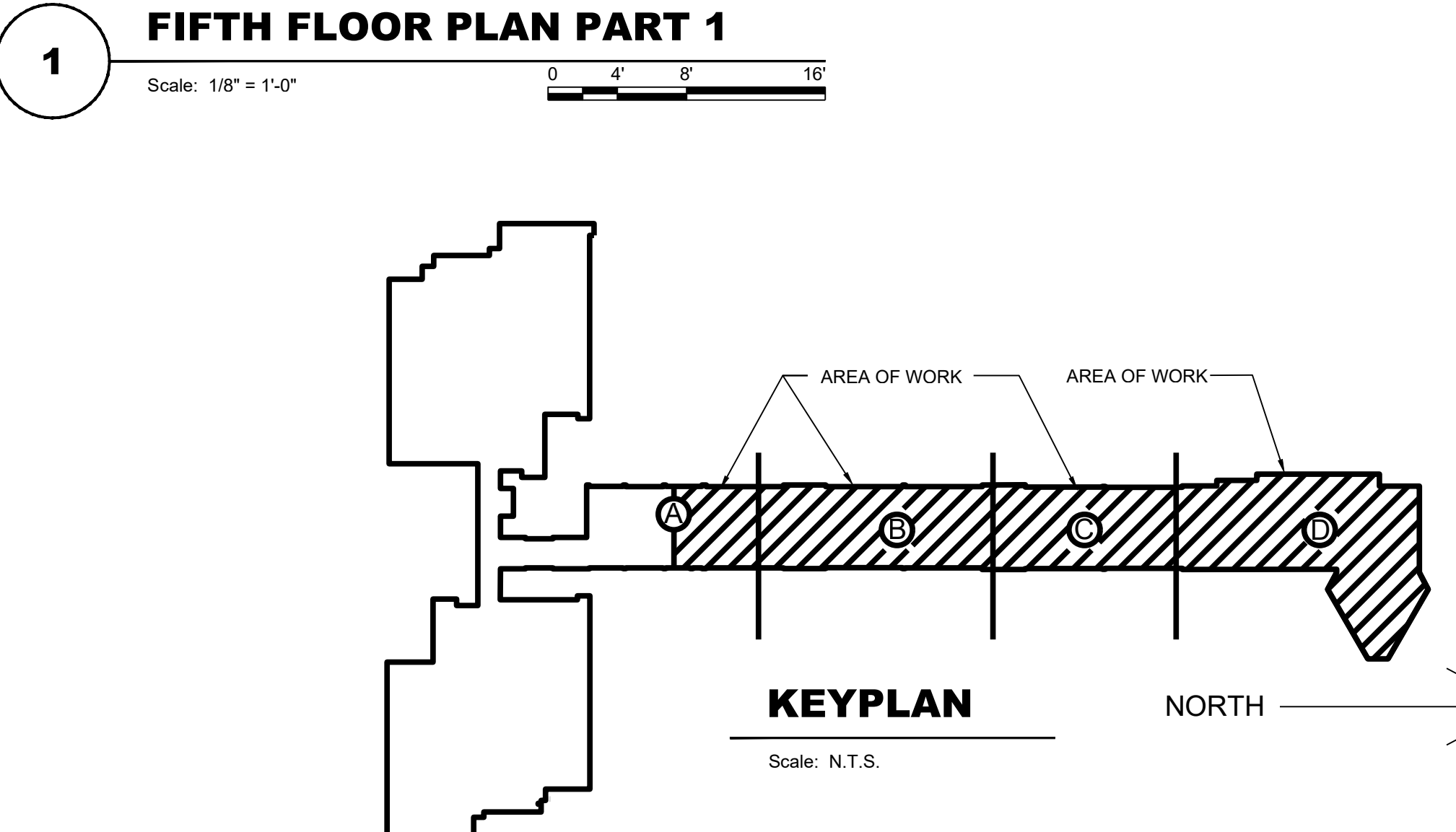
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Drawn By: SNMA/JP
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Date: 12/18/2024
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EL.1.9
Sheet 12 of 24



- KEYNOTES THIS DRAWING:**
- REMOVE PITTSBURGH SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER. EGRESS CIRCUIT SHALL BE MAINTAINED VIA TRANSFER DEVICE.
 - WIRELESS SWITCH (E.C. SHALL PROGRAM)
 - E.C. SHALL PROGRAM ROOM LIGHTS
 - PROVIDE ENLIGHTED TRANSFER DEVICE - LOCATE AT PANEL EMP - MAINTAIN NORMAL CIRCUIT
 - REMOVE EXISTING FIXTURE - MAINTAIN AND REUSE CIRCUIT - PROVIDE MOUNTING ACCESSORIES AS REQUIRED
 - REMOVE PITTSBURGH SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER. EGRESS CIRCUIT SHALL BE MAINTAINED.
 - REMOVE SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER. EGRESS CIRCUIT SHALL BE MAINTAINED VIA TRANSFER DEVICE.
 - PROVIDE SCREW BASE AFTER MARKET LED LAMPS - ALLOW FOR SCAFFOLDING THIS AREA

- GENERAL NOTES THIS SHEET:**
- ALL DRAWINGS ARE DERIVED FROM EXISTING NON-CAD PDF'S. THEREFORE THE SCALE IS APPROXIMATE.
 - EC SHALL INSTALL ENLIGHTED TRANSFER DEVICE FOR ALL EGRESS CIRCUITS EXCEPT STAIRWELLS AND EXTERIOR CIRCUITS. EC SHALL INTERCEPT LOCAL NORMAL LIGHTING CIRCUITS. EC SHALL INTERCEPT LOCAL NORMAL LIGHTING CIRCUITS (TYPICALLY 277VAC) AND CONNECT CIRCUIT TO TRANSFER DEVICE - EC SHALL CIRCUIT EMERGENCY PORTION OF TRANSFER DEVICE TO LOCAL GENERATOR SUPPORTED CIRCUIT (TYPICALLY 120VAC EXCEPT WEST WING - SEE PLAN SHEETS). THE LIGHTS IDENTIFIED AS EGRESS SHALL BE POWERED BY THE LOCAL NORMAL CIRCUIT (GENERALLY NOT SHOWN ON DRAWINGS) UNDER STANDARD OCCUPANCY CONDITIONS AND POWERED BY GENERATOR UNDER LOSS OF NORMAL POWER - BY USE OF THE ENLIGHTED TRANSFER DEVICE. THESE LIGHTING FIXTURES SHALL BE PROGRAMMED TO FULL BRIGHTNESS AND NOT REQUIRE AN OCCUPANT TO ACTUATE THE OCCUPANCY SENSOR (THESE FIXTURES SHALL TURN ON FULL UNTIL SUCH TIME AS NORMAL POWER IS RESTORED). CONTRACTOR TO FIELD VERIFY FIXTURES EXACT LOCATION AND MOUNTING TYPE.



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Project Identification:

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OF ALLEGHENY
COUNTY
BOYCE CAMPUS**

**EGRESS LIGHTING
MODIFICATIONS**

**506 BEATTY ROAD
MONROEVILLE, PA
15146-1348**

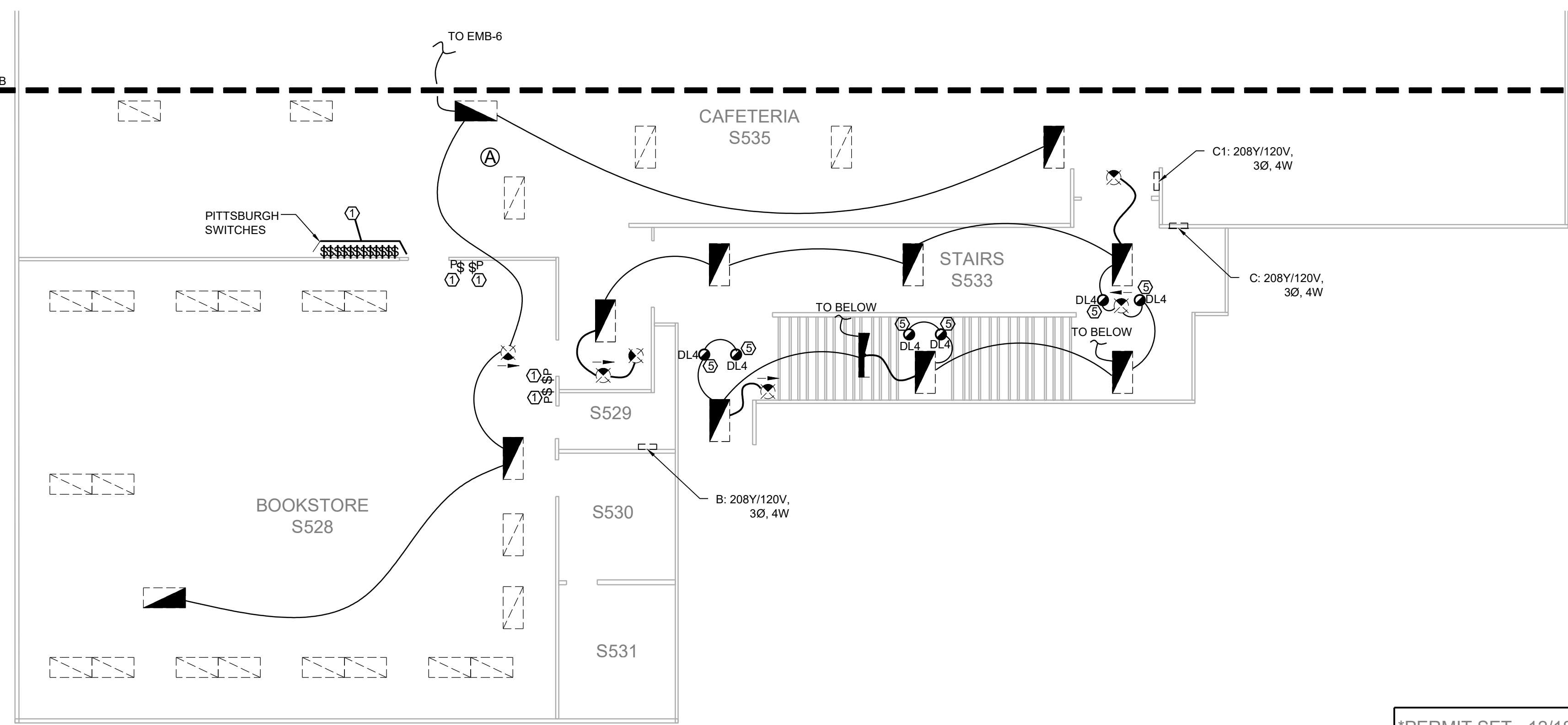
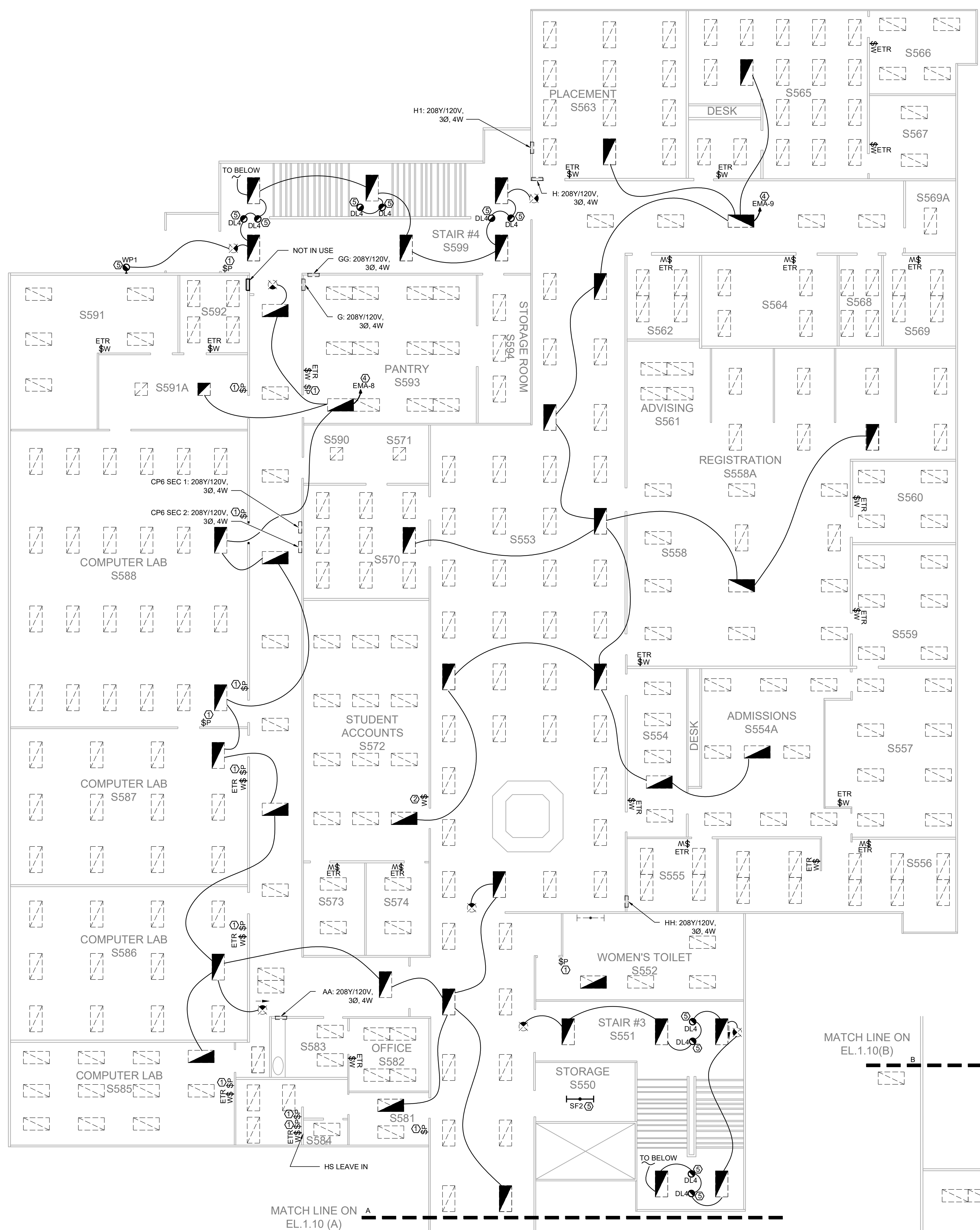
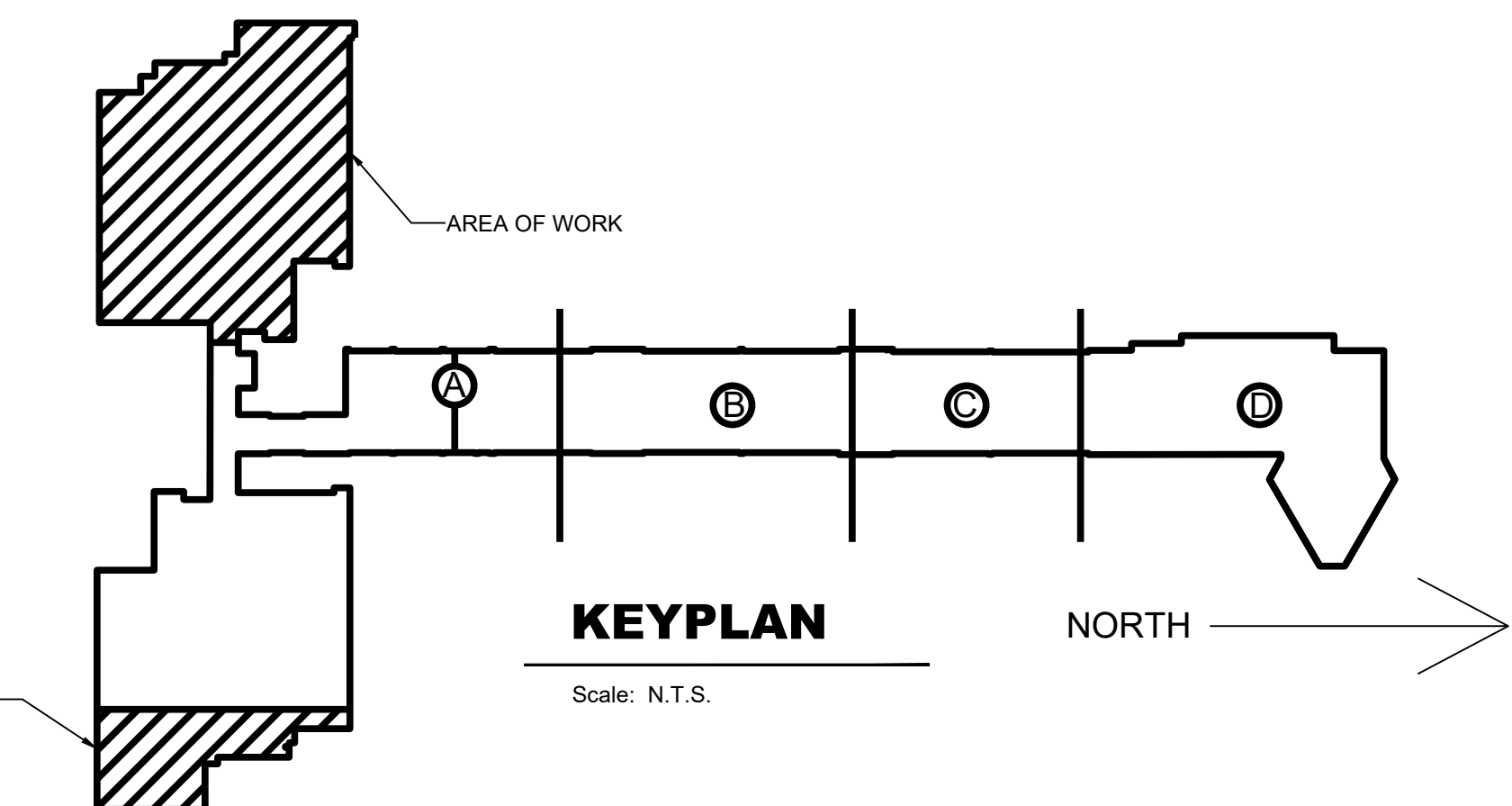
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GENERAL NOTES THIS SHEET:

- ALL DRAWINGS ARE DERIVED FROM EXISTING NON-CAD PDFs. THEREFORE THE SCALE IS APPROXIMATE.
- EC SHALL INSTALL ENLIGHTED TRANSFER DEVICE FOR ALL EGRESS CIRCUITS EXCEPT STAIRWELLS AND EXTERIOR CIRCUITS. EC SHALL INTERCEPT LOCAL NORMAL LIGHTING CIRCUIT (TYPICALLY 277VAC) AND CONNECT CIRCUIT TO TRANSFER DEVICE - EC SHALL CIRCUIT EMERGENCY PORTION OF TRANSFER DEVICE TO LOCAL GENERATOR SUPPORTED CIRCUIT (TYPICALLY 120VAC EXCEPT WEST WING - SEE PLAN SHEETS). THE LIGHTS IDENTIFIED AS EGRESS SHALL BE POWERED BY THE LOCAL NORMAL CIRCUIT (GENERALLY NOT SHOWN ON DRAWINGS) UNDER STANDARD OCCUPANCY CONDITIONS AND POWERED BY GENERATOR UNDER LOSS OF NORMAL POWER - BY USE OF THE ENLIGHTED TRANSFER DEVICE. THESE LIGHTING FIXTURES SHALL BE PROGRAMMED TO FULL BRIGHTNESS AND NOT REQUIRE AN OCCUPANT TO ACTIVATE THE OCCUPANCY SENSOR (THESE FIXTURES SHALL TURN ON FULL UNTIL SUCH TIME AS NORMAL POWER IS RESTORED). CONTRACTOR TO FIELD VERIFY FIXTURES EXACT LOCATION AND MOUNTING TYPE.

KEYNOTES THIS DRAWING:

- REMOVE PITTSBURGH SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER, EGRESS CIRCUIT SHALL BE MAINTAINED VIA TRANSFER DEVICE.
- WIRELESS SWITCH (E.C. SHALL PROGRAM)
- E.C. SHALL PROGRAM ROOM LIGHTS
- PROVIDE ENLIGHTED TRANSFER DEVICE - LOCATE AT PANEL EMP - MAINTAIN NORMAL CIRCUIT
- REMOVE EXISTING FIXTURE - MAINTAIN AND REUSE CIRCUIT - PROVIDE MOUNTING ACCESSORIES AS REQUIRED
- REMOVE PITTSBURGH SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER, EGRESS CIRCUIT SHALL BE MAINTAINED.
- REMOVE SWITCH - REARRANGE CIRCUIT FOR CONTINUOUS POWER, EGRESS CIRCUIT SHALL BE MAINTAINED VIA TRANSFER DEVICE.



1 FIFTH FLOOR PLAN PART 3
Scale: 1/8" = 1'-0"

*PERMIT SET - 12/18/2024

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COUNTY
BOYCE CAMPUS**

EGRESS LIGHTING

**506 BEATTY ROAD
MONROEVILLE, PA
15146-1348**

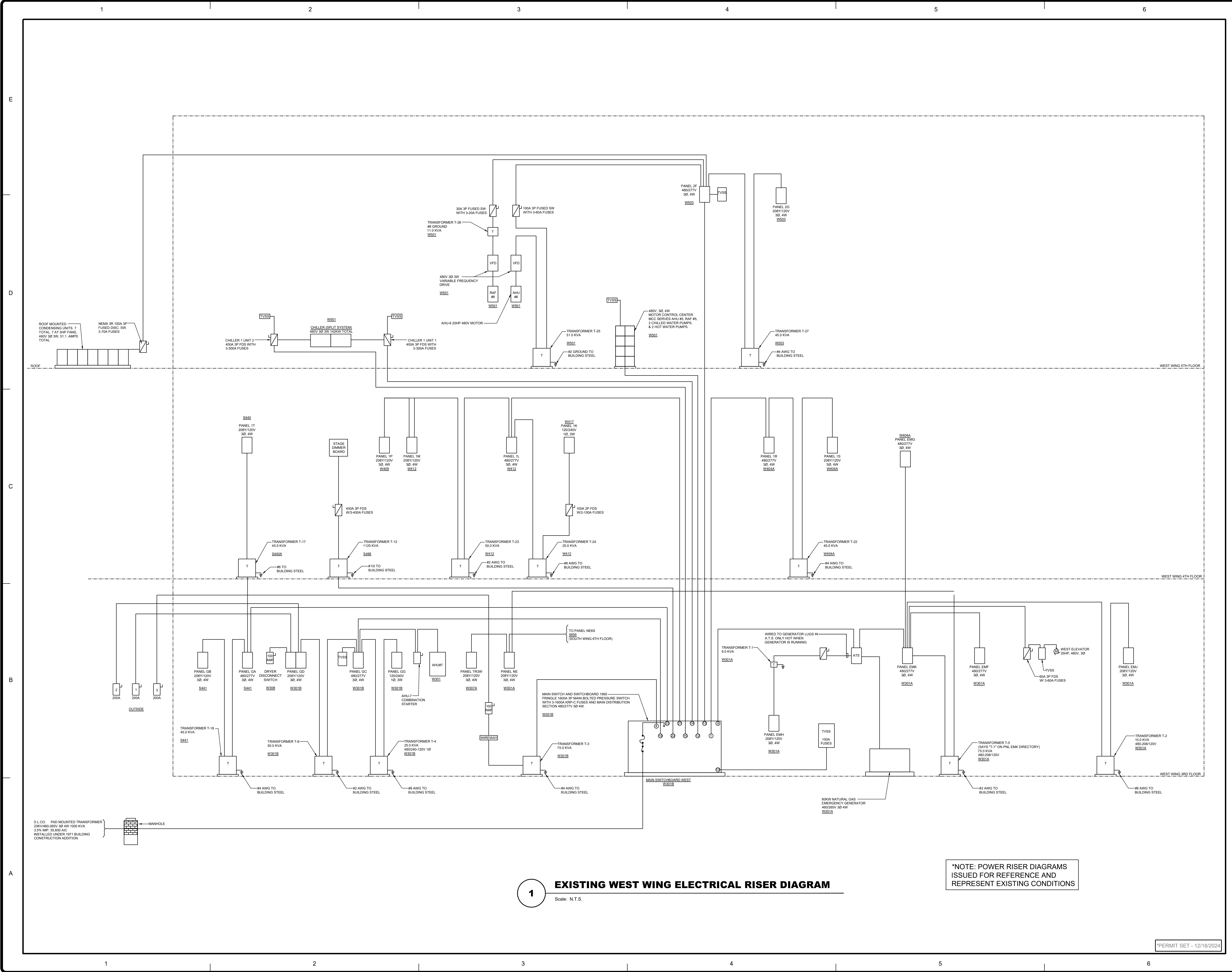
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Sheet Title:
POWER RISER DIAGRAM

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Cadd Drawing File: E.5.3.dwg
Drawn By: JSS
Checked By: CVU
Date: 02/15/2023

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Drawing Number

E.5.3



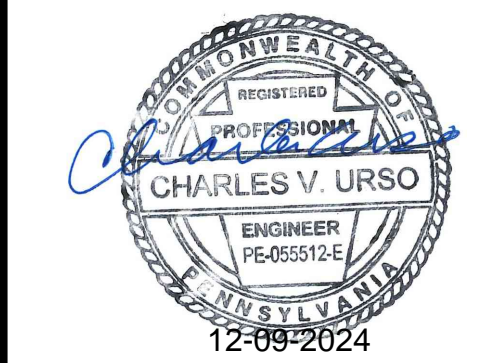
1 EXISTING WEST WING ELECTRICAL RISER DIAGRAM
Scale: N.T.S.

*NOTE: POWER RISER DIAGRAMS
ISSUED FOR REFERENCE AND
REPRESENT EXISTING CONDITIONS

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**EGRESS LIGHTING
MODIFICATIONS**

**506 BEATTY ROAD
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15146-1348**

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Sheet Title:
**ELECTRICAL
DETAILS**

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Drawn By: AJP

Checked By: CVU

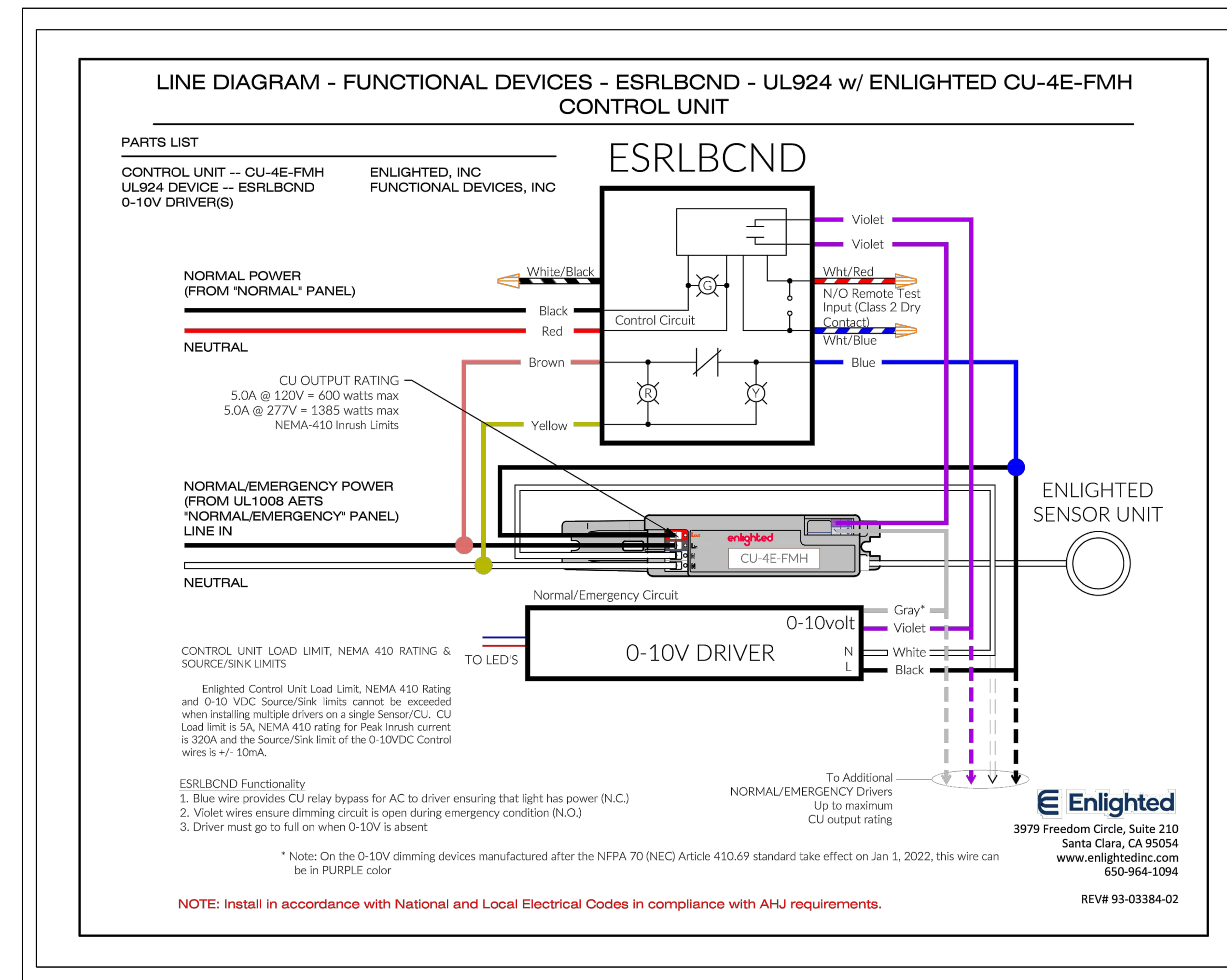
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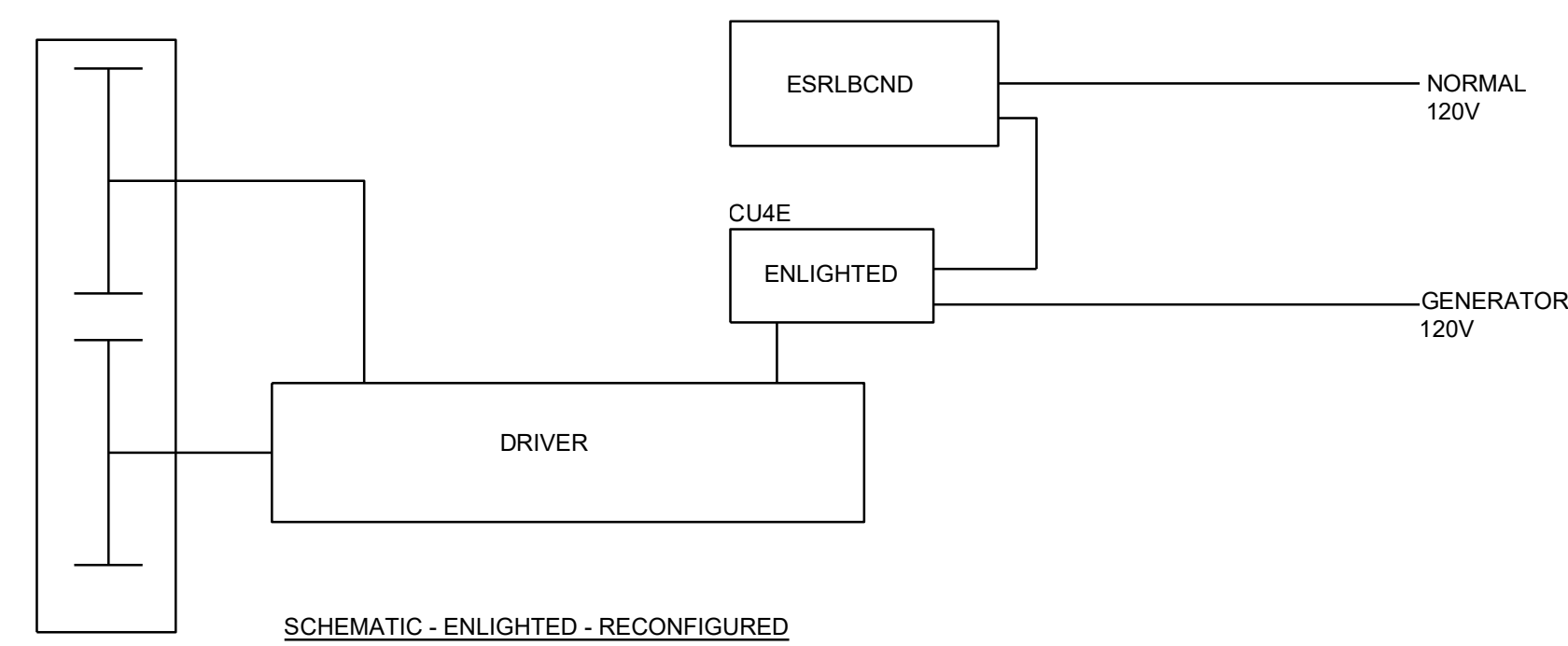
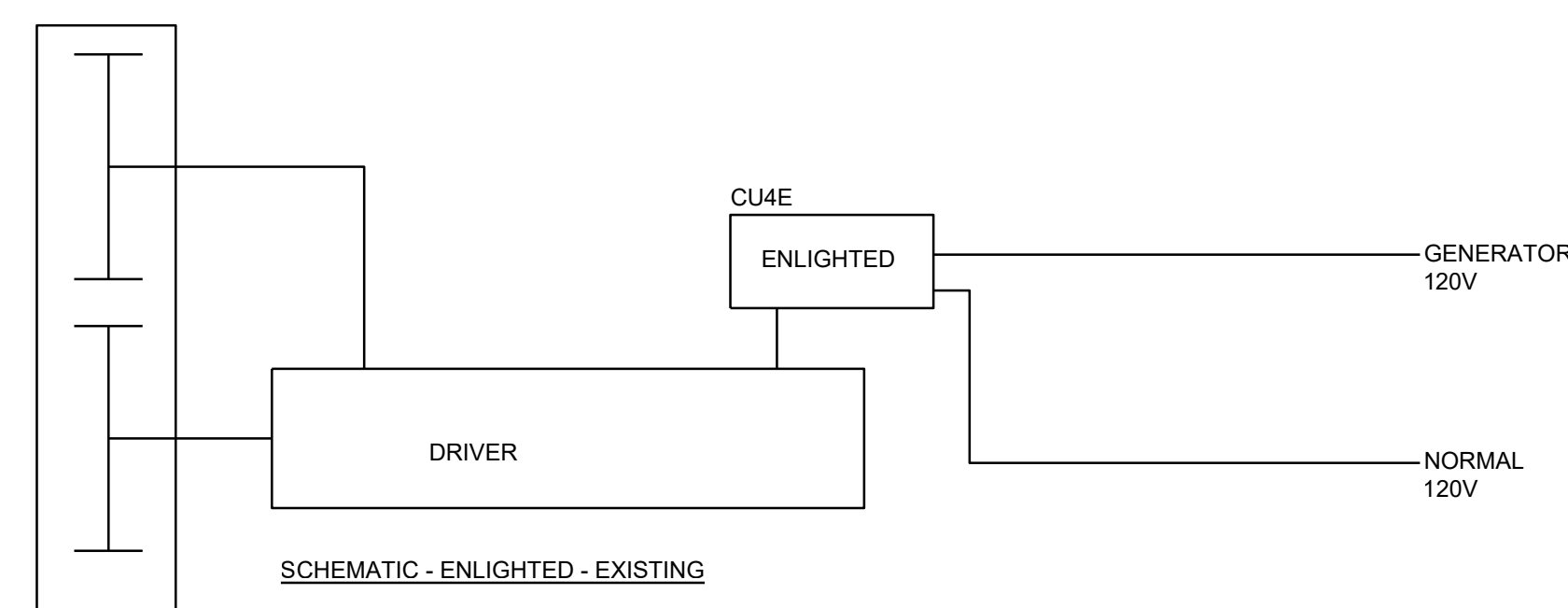
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Sheet 20 of 24



1 TRANSFER DEVICE LINE DIAGRAM

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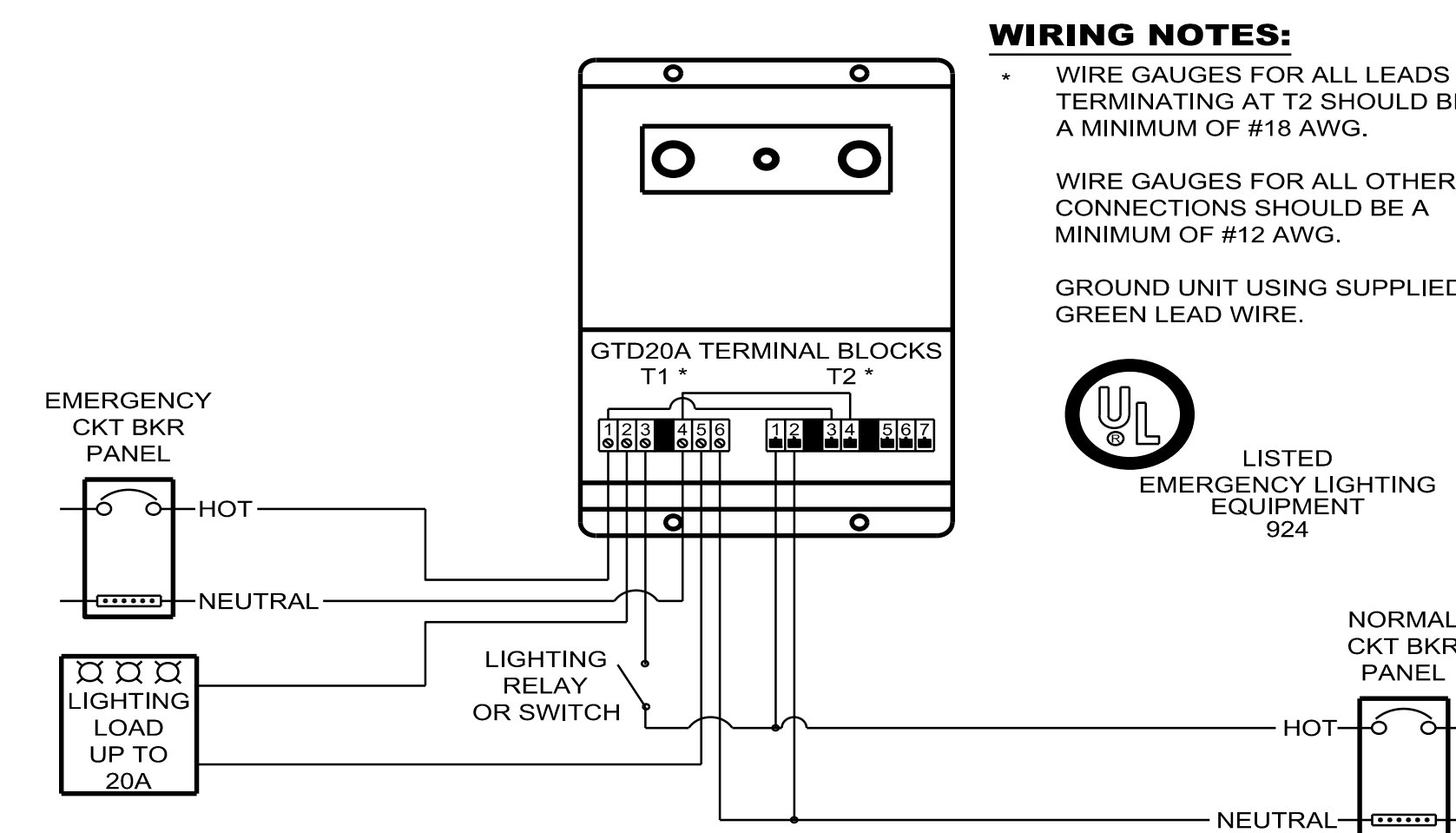
3 SCHEMATIC ENLIGHTED DIAGRAM

Scale: N.T.S.

NOTES:
1. THIS DIAGRAM IS INFORMATIONAL ONLY.
2. SEE TRANSFER DEVICE LINE DIAGRAM, THIS DRAWING, FOR ADDITIONAL INFORMATION.

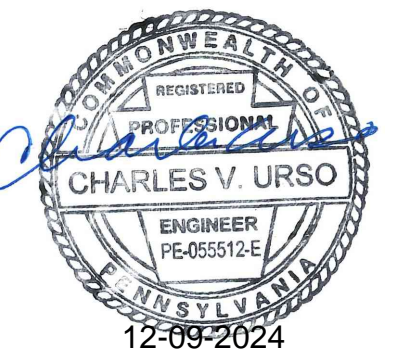
2 BODINE GTD20A WIRING DIAGRAM FOR EMERGENCY LIGHTING

Scale: N.T.S.



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**EGRESS LIGHTING
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Sheet Title:

**ELECTRICAL
DETAILS**

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Drawn By: SNM/AJP

Checked By: CVU

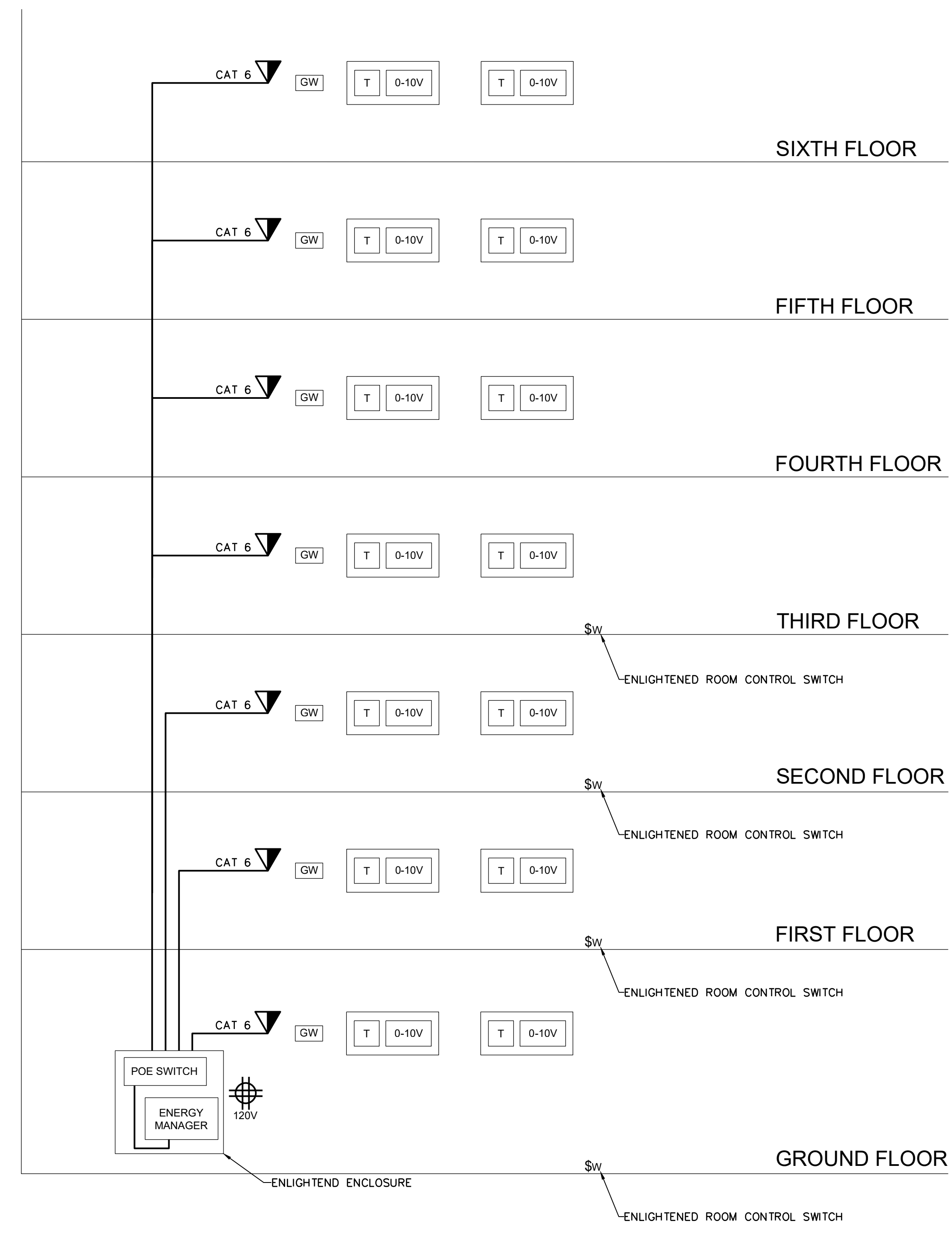
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Sheet 21 of 24



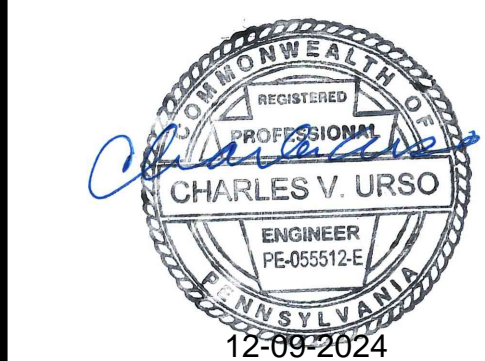
1 WIRELESS CONTROL SYSTEM - THIS IS FOR REFERENCE ONLY
Scale: N.T.S.

- NOTES:**
1. THIS DETAIL IS REPRESENTATIVE OF THE ENLIGHTED WIRELESS SYSTEM. NOT ALL COMPONENTS ARE SHOWN.
 2. THIS DIAGRAM IS PROVIDED FOR REFERENCE ONLY - THE ENLIGHTED CONTROL SYSTEM IS EXISTING TO REMAIN.
 3. CONTRACTOR SHALL PROVIDE WIRELESS SWITCHES AND ASSOCIATED PROGRAMMING AS REQUIRED.
 4. CONTRACTOR SHALL PROVIDE PROGRAMMING FOR LIGHTING IN ANY AREA IDENTIFIED OR ANY AREA WITH FIXTURES PROVIDED UNDER THIS PROJECT.

*PERMIT SET - 12/18/2024

Consultants:

Seat:



Seat:

Project Identification:

**COMMUNITY COLLEGE
OF ALLEGHENY
COUNTY
BOYCE CAMPUS**

**EGRESS LIGHTING
MODIFICATIONS**

**506 CHARLES ROAD
MONROEVILLE, PA
15146-1348**

| No.: | Date: | Description: |
|------|-------|--------------|
| | | |
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| | | |
| | | |

Sheet Title:

**ELECTRICAL
DETAILS**

Project No.: 2023-2010.01

Cadd Drawing File: 2010-E6_3.dwg

Drawn By: SNM/AJP

Checked By: CVU

Date: 12/18/2024

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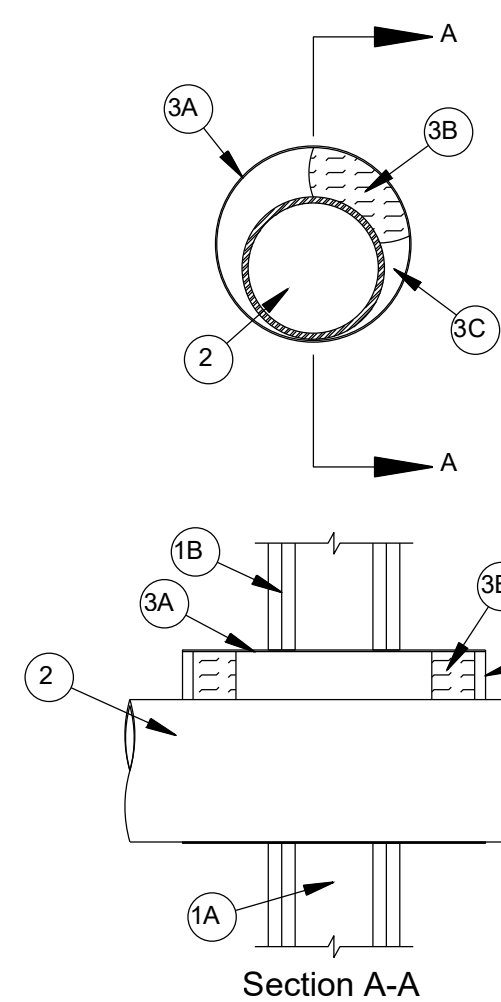
Drawing Number

E.6.3

Sheet 22 of 24

System No. W-L-1303

F Rating - 1 and 2 Hr (See Item 1)
T Rating - 1/4 Hr



1 TYPICAL RECESSED LIGHTING FIXTURE MOUNTING DETAIL

Scale: N.T.S.

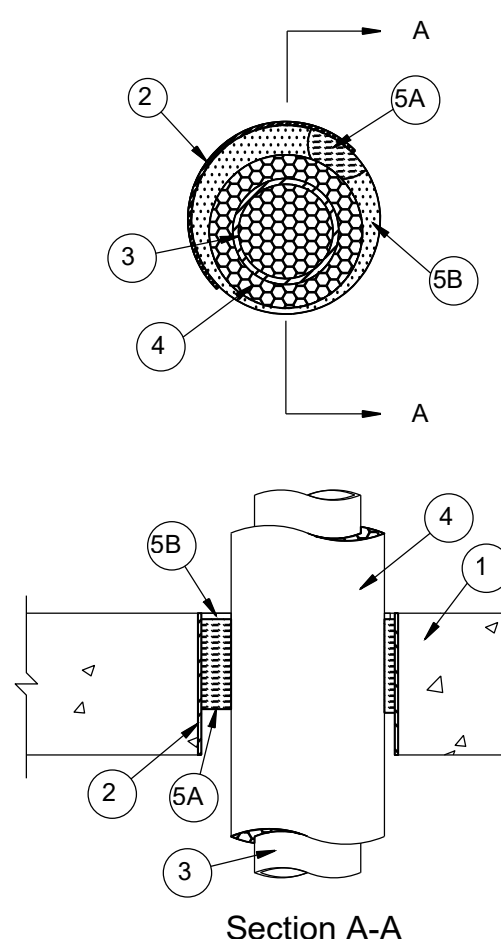
THROUGH PENETRATION - GYPSUM WALL METALLIC CONDUIT

NOTES:

- Wall Assembly - The fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
 - Gypsum Board* - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max dim of opening is 12 in. (305 mm). Max diam of opening is 12 in. (305 mm) when wood studs are used. The hourly F Rating of the freestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
 - Through Penetrants - One metallic pipe, conduit or tube installed concentrically or eccentrically within the freestop system. Annular space to be min 0 in. (following contact) to max 3 in. (76 mm). Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
 - Steel Pipe - Nom 12 in. (305 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - Iron Pipe - Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
 - Conduit - Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT) or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.
 - Copper Pipe or Tubing - Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe or Type L (or heavier) copper tube.
- Firestop System - The freestop system shall consist of the following:
 - Metallic Sleeve - Cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) thick (30 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sheet steel coiled to a diam less than circular cutouts in the wall assembly, inserted through both sides of wall and allowed to uncoil against the circular cutouts in the wall assembly. Sleeve to be installed flush with or extending max 4 in. (102 mm) beyond each surface of the wall assembly.
 - Metallic Sleeve - (Optional, Not Shown) - As an alternate to Item 3A, steel sleeve may consist of Schedule 5 (or heavier) steel pipe, rigid steel conduit or EMT friction-fitted into wall assembly flush with or extending 4 in. (102 mm) beyond each surface of the wall assembly.
 - Packing Material - Min 2 in. (51 mm) thickness of nom 4 pcf (64 kg/m³) mineral wool batt insulation tightly-packed into ends of steel sleeve and recessed to accommodate required thickness of fill material (Item 3C).
 - Fill, Void or Cavity Materials* - Sealant - Min 1/2 in. (13 mm) thickness of fill material applied within annular space flush with edges of steel sleeve on both sides of the wall assembly. Nom 1/4 in. (6 mm) diam bead of fill material to be applied at the point contact location between the metallic penetrant and the steel sleeve. Additional nom 1/4 in. (6 mm) diam bead of fill material applied at the steel sleeve/gypsum board interface when sleeve projects beyond the surface of the wall assembly. SPECIFIED TECHNOLOGIES INC - Pensil 300 Sealant or SpecSeal Series SIL300 Sealant
*Bearing the UL Classification Mark

System No. C-AJ-5311

F Rating - 2 Hr
T Rating - 1/2 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft
W Rating - Class 1



2 TYPICAL SUSPENDED LIGHTING FIXTURE MOUNTING DETAIL

Scale: N.T.S.

THROUGH PENETRATION - CONCRETE FLOOR/WALL METALLIC CONDUIT

NOTES:

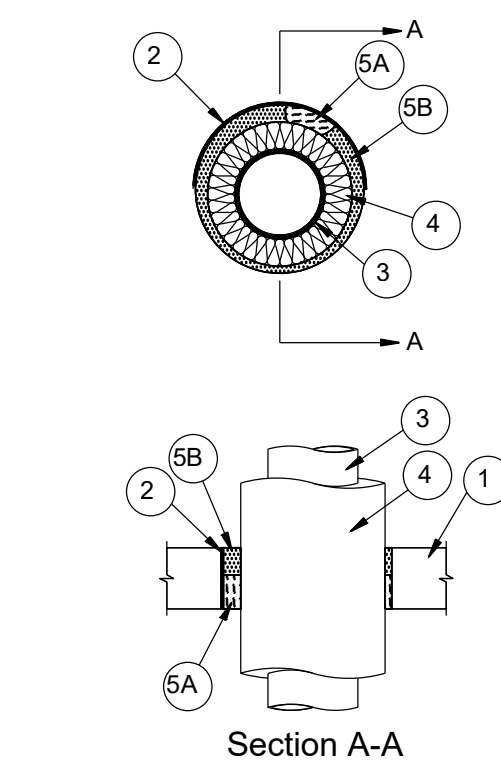
- Floor or Wall Assembly - Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks* Max diam of opening 6 in. (203 mm). See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- Steel Sleeve - (Optional) - Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast into floor or wall assembly. As an alternate, nom 6 in. (152 mm) diam (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick galv steel cast into floor or wall assembly flush with floor or wall surfaces.
- Through Penetrant - One metallic pipe or tubing to be installed either concentrically or eccentrically within the freestop system. Penetrant rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipe or tubing may be used:
 - Steel Pipe - Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - Iron Pipe - Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.
 - Copper Tubing - Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tube.
 - Copper Pipe - Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
- Tube Insulation - Plastics* - Sealant - Min 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tube and the edge of the through opening shall be min 3/4 in. (19 mm) to max 1-5/8 in. (41 mm). See Plastics (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-SVA may be used.
- Firestop System - The details of the freestop system shall be as follows:
 - Packing Material - Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.
 - Fill, Void or Cavity Materials* - Sealant - Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or wall assembly. A min 1/16 in. (1.6 mm) thick film of sealant shall be applied to cover edge of steel sleeve and to lap min 1/2 in. (13 mm) onto concrete around perimeter of opening. SPECIFIED TECHNOLOGIES INC - Pensil 300 Sealant or SpecSeal Series SIL300 Sealant for floors and walls and Pensil 300 S/L Sealant or SpecSeal Series SIL300S/L Sealant for floors only.
*Bearing the UL Classification Mark
**Bearing the UL Recognized Component Marking

3 DOWNLIGHT MOUNTING - LAY-IN CEILING

Scale: N.T.S.

System No. C-AJ-5312

F Rating - 2 Hr
T Rating - 1 Hr
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft
W Rating - Class 1 (See Item 4A)



4 DOWNLIGHT MOUNTING - GYPBOARD CEILING

Scale: N.T.S.

THROUGH PENETRATION - CONCRETE FLOOR/WALL METALLIC CONDUIT

3 FIRE STOP DETAILS

Scale: N.T.S.

FIRESTOP GENERAL NOTES

- Any pipe or conduit with a diameter smaller than the listed value may be used.
- Any pipe or conduit with a wall thickness heavier than the listed value may be used.
- A rated firestop system "F" rating may be applied to a wall or floor of equal or lesser "F" rating, the system then is rated at the lesser "F" rating.
- Stencil UL number on both sides of wall above ceiling and on pipe in ceiling.
- Stencil UL number on pipe/pipe insulation for vertical penetration. Stencil on both sides of penetration.
- Provide STI sticker on both sides of penetration (wall or floor). Include STI detail number, wall/floor UL rating, date installed, and installing contractor.
- UL system number to be verified in field for appropriate wall/floor system.
- Seal unrated walls similar to firestop details.
- Seal existing pipes thru existing wall/floor that are not sealed, for bidding purposes, seal 10 pipe penetrations assuming 4" diameter pipes. (both insulated and uninsulated)
- Fire stop material shall be as follows. Drywall penetrations shall be latex based and red in color. Floor, concrete, and exterior penetrations shall be grey in color and silicon based. Deviations shall be submitted to the engineer for review.
- Firestop shall be products as manufactured by STI.

*PERMIT SET - 12/18/2024

| EXISTING PANEL 2A | | | | | |
|-------------------|------------------------------|------|----------|---------------------------------|----------|
| MAIN | 100 | MLO | VOLTAGE | 480 /277V | MOUNTING |
| BUSING | 100 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS MAIN CORR. N217, HALL | 20/1 | 20/1 | LIGHTS N203, 202 | 2 |
| 3 | LIGHTS MAIN CORR. HALL | 20/1 | 20/1 | LIGHTS MAIN RECEPT-SECTION HALL | 4 |
| 5 | LIGHTS N228, 227, 218 | 20/1 | 20/1 | LIGHTS N220, 222 | 6 |
| 7 | LIGHTS N226, 225, 224 | 20/1 | 20/1 | LIGHTS N235, 221 | 8 |
| 9 | LIGHTS N223, 206, 205 | 20/1 | 20/1 | LIGHTS N229, 230 | 10 |
| 11 | LIGHT S ? | 20/1 | 20/1 | ? | 12 |
| 13 | LIGHTS N251, 252, 253 | 20/1 | 20/1 | EXISTING | 14 |
| 15 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING | 16 |
| 17 | SPACE | --- | --- | SPACE | 18 |
| 19 | SPACE | --- | --- | SPACE | 20 |
| 21 | SPACE | --- | --- | SPACE | 22 |
| 23 | SPACE | --- | --- | SPACE | 24 |
| 25 | SPACE | --- | --- | SPACE | 26 |
| 27 | SPACE | --- | --- | SPACE | 28 |
| 29 | SPACE | --- | --- | SPACE | 30 |
| 31 | SPACE | --- | --- | SPACE | 32 |
| 33 | SPACE | --- | --- | SPACE | 34 |
| 35 | SPACE | --- | --- | SPACE | 36 |

| EXISTING PANEL 3A | | | | | |
|-------------------|----------------------|------|----------|----------------------|----------|
| MAIN | 100 | MLO | VOLTAGE | 480 /277V | MOUNTING |
| BUSING | 100 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | CLASSROOM LTS 312 | 20/1 | 20/1 | HALLWAY LTS | 2 |
| 3 | CLASSROOM LTS 314 | 20/1 | 20/1 | HALLWAY LTS | 4 |
| 5 | CLASSROOM LTS 315/16 | 20/1 | 20/1 | BATHROOM LTS | 6 |
| 7 | CLASSROOM LTS 313 | 20/1 | 20/1 | EXISTING | 8 |
| 9 | CLASSROOM LTS 311 | 20/1 | 20/1 | FAN RM S-3 LTS | 10 |
| 11 | EXISTING (OFF) | 20/1 | 20/1 | EAST ADD MECH RM LTS | 12 |
| 13 | CLASSROOM LTS 310 | 20/1 | 20/1 | CLASSROOM LTS 08 | 14 |
| 15 | CLASSROOM LTS 304 | 20/1 | 20/1 | CLASSROOM LTS 07 | 16 |
| 17 | LTS & PHONE RM | 20/1 | 20/1 | EXISTING (OFF) | 18 |
| 19 | CLASSROOM LTS 306 | 20/1 | 20/1 | EXISTING (OFF) | 20 |
| 21 | CLASSROOM LTS 308 | 20/1 | 20/1 | HALLWAY | 22 |
| 23 | CLASSROOM LTS 306 | 20/1 | 20/1 | N319 | 24 |
| 25 | SPACE | --- | --- | SPACE | 26 |
| 27 | SPACE | --- | --- | SPACE | 28 |
| 29 | SPACE | --- | --- | SPACE | 30 |
| 31 | SPACE | --- | --- | SPACE | 32 |
| 33 | SPACE | --- | --- | SPACE | 34 |
| 35 | SPACE | --- | --- | SPACE | 36 |

| EXISTING PANEL 4A | | | | | |
|-------------------|------------------------------------|------|----------|------------------------------------|----------|
| MAIN | 225 | MLO | VOLTAGE | 480 /277V | MOUNTING |
| BUSING | 225 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS CONCOURSE LOBBY & STAIRS #1 | 20/1 | 20/1 | LIGHTS CORRIDOR | 2 |
| 3 | LIGHTS CORRIDOR | 20/1 | 20/1 | LIGHTS LECTURE CENTER | 4 |
| 5 | LIGHTS 4-029 A, B, C | 20/1 | 20/1 | LIGHTS 4-062, 4-061, 4-060 | 6 |
| 7 | LIGHTS 4- D, E, F | 20/1 | 20/1 | LIGHTS 4-064, 4-063 | 8 |
| 9 | LIGHTS 4-023, 4-033 1 HALL IN 488 | 20/1 | 20/1 | LIGHTS G, H, 4-400 & N 488 | 10 |
| 11 | S | 20/1 | 20/1 | LIGHTS LADIES ROOM 4-025 C, D, 480 | 12 |
| 13 | LIGHTS 4-059, 4-058, 4-057 | 20/1 | 20/1 | LIGHTS 4-025 F, G | 14 |
| 15 | LIGHTS 4-056, 4-055 | 20/1 | 20/1 | LIGHTS 4-026 H, 4-028 B, C | 16 |
| 17 | LIGHTS 4-054, 4-053, 4-052 | 20/1 | 20/1 | LIGHTS 4-026 D, E, F | 18 |
| 19 | LIGHTS 4-051, 4-050, 4-049 | 20/1 | 20/1 | LIGHTS 4-025 B, CORRIDOR | 20 |
| 21 | LIGHTS N462-472 | 20/1 | 20/1 | LIGHTS N472, N462 | 22 |
| 23 | LIGHTS LECTURE ROOM STORAGE | 20/1 | 20/1 | LIGHTS 4-025 I, 4-026 A | 24 |
| 25 | LIGHTS LECTURE CENTER | 20/1 | 20/1 | LIGHTS LECTURE CENTER | 26 |
| 27 | LIGHTS LECTURE CENTER | 20/1 | 20/1 | LIGHTS LECTURE CENTER | 28 |
| 29 | LIGHTS LECTURE CENTER | 20/1 | 20/1 | LIGHTS LECTURE CENTER | 30 |
| 31 | S | 20/1 | 20/1 | LIGHTS STAIRS #5 FAN S1 STORAGE | 32 |
| 33 | S | 20/1 | 20/1 | S | 34 |
| 35 | S | 20/1 | 20/1 | S | 36 |
| 37 | S | 20/1 | 20/1 | PHASE DETECTOR | 38 |
| 39 | S | 20/1 | 20/1 | PHASE DETECTOR | 40 |
| 41 | S | 20/1 | 20/1 | PHASE DETECTOR | 42 |
| 43 | SPACE | --- | --- | SPACE | 44 |
| 45 | SPACE | --- | --- | SPACE | 46 |
| 47 | SPACE | --- | --- | SPACE | 48 |

| EXISTING PANEL 5A | | | | | |
|-------------------|-------------------------------|------|----------|------------------------|------------------|
| MAIN | 225 | MLO | VOLTAGE | 480 /277V | MOUNTING SURFACE |
| BUSING | 225 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS CORR. N551 | 20/1 | 20/1 | LIGHTS N570 | 2 |
| 3 | LIGHTS N574 | 20/1 | 20/1 | LIGHTS N570 | 4 |
| 5 | LIGHTS HALLWAY BY N572 | 20/1 | 20/1 | LIGHTS N564 | 6 |
| 7 | LIGHTS N573 | 20/1 | 20/1 | LIGHTS N566 | 8 |
| 9 | LIGHTS N568 | 20/1 | 20/1 | LIGHTS N567 | 10 |
| 11 | LIGHTS N568 | 20/1 | 20/1 | LIGHTS N563 562 561 | 12 |
| 13 | LIGHTS N554/N552/N552 | 20/1 | 20/1 | LIGHTS N560 | 14 |
| 15 | LIGHTS N550 | 20/1 | 20/1 | LIGHTS N551 | 16 |
| 17 | LIGHTS N548 | 20/1 | 20/1 | LIGHTS N549 | 18 |
| 19 | LIGHTS N546 | 20/1 | 20/1 | LIGHTS N545 | 20 |
| 21 | LIGHTS N544 | 20/1 | 20/1 | LIGHTS N543 | 22 |
| 23 | LIGHTS N542 1/2 | 20/1 | 20/1 | LIGHTS CORR. N540 N551 | 24 |
| 25 | LIGHTS UPPER CONCOURSE NEAR T | 20/1 | 20/1 | PHASE DETECTOR | 26 |
| 27 | LIGHTS N555 | 20/1 | 20/1 | PHASE DETECTOR | 28 |
| 29 | S | 20/1 | 20/1 | PHASE DETECTOR | 30 |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |

| EXISTING PANEL 4B | | | | | |
|-------------------|----------------------------|---------|-----------|-----------------------------------|----|
| MAIN | MLO | VOLTAGE | 480 /277V | MOUNTING | |
| BUSING | 100 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS CORR. BY LIBRARY | 20/1 | 20/1 | LIGHTS CORR. BY LIBRARY | 2 |
| 3 | LIGHTS STAIRS #6 & #7 | 20/1 | 20/1 | LIGHTS CORR. BY ELEVATOR | 4 |
| 5 | LIGHTS 4-026 G MEN 4-026 C | 20/1 | 20/1 | LIGHTS N418 | 6 |
| 7 | LIGHTS 4-028 D, E, F | 20/1 | 20/1 | LIGHTS 4-030 | 8 |
| 9 | LIGHTS 4-028 B, 4-028 H | 20/1 | 20/1 | LIGHTS 4-048, 4-047, 4-046 | 10 |
| 11 | LIGHTS 4-028 | 20/1 | 20/1 | LIGHTS 4-045, 4-044, 4-043, 4-042 | 12 |
| 13 | LIGHTS 4-029 A, 4-028 I | 20/1 | 20/1 | LIGHTS 4-041, 4-040, 4-039 | 14 |
| 15 | LIGHTS N418 | 20/1 | 20/1 | LIGHTS N414 | 16 |
| 17 | LIGHTS 4-028 G H 4-029 B | 20/1 | 20/1 | LIGHTS N414 | 18 |
| 19 | LIGHTS 4-029 C, D, E | 20/1 | 20/1 | LIGHTS 4-030 JAN. - MEN & WOMEN | 20 |
| 21 | LIGHTS FAN #2 | 20/1 | 20/1 | LIGHTS | 22 |
| 23 | HALLWAY LIGHTS | 20/1 | 20/1 | S | 24 |
| 25 | PHASE DETECTOR | --- | --- | S | 26 |
| 27 | PHASE DETECTOR | --- | --- | S | 28 |
| 29 | PHASE DETECTOR | --- | --- | S | 30 |
| 31 | SPACE | --- | --- | SPACE | 32 |
| 33 | SPACE | --- | --- | SPACE | 34 |
| 35 | SPACE | --- | --- | SPACE | 36 |

| EXISTING PANEL 5B | | | | | |
|-------------------|----------------------------------|------|----------|--|----------|
| MAIN | 100 | MLO | VOLTAGE | 480 /277V | MOUNTING |
| BUSING | 100 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |
| | SPACE | --- | --- | SPACE | |
| 1 | LIGHTS CORRIDOR DOUBLE DOOR N533 | 20/1 | 20/1 | LIGHTS N504 CORRIDOR N502 DOUBLE DOORS | 2 |
| 3 | LIGHTS MENS N540/N541/N542 1/2 | 20/1 | 20/1 | LIGHTS CORRIDOR BY N504 AND STAIRS | 4 |
| 5 | LIGHTS N533 | 20/1 | 20/1 | LIGHTS N531/N530 | 6 |
| 7 | LIGHTS N533 | 20/1 | 20/1 | LIGHTS N530 | 8 |
| 9 | LIGHTS N532 | 20/1 | 20/1 | LIGHTS 5-054 | 10 |
| 11 | LIGHTS N532 | 20/1 | 20/1 | LIGHTS | 12 |
| 13 | LIGHTS N521/516 | 20/1 | 20/1 | LIGHTS N520 REAR | 14 |
| 15 | LIGHTS 510, 511, 512, 513 | 20/1 | 20/1 | LIGHTS N522 | 16 |
| 17 | LIGHTS N509 | 20/1 | 20/1 | LIGHTS MEN & WOMEN N514, N515 | 18 |
| 19 | S | 20/1 | 20/1 | LIGHTS N503/N502 | 20 |
| 21 | S | 20/1 | 20/1 | S | 22 |
| 23 | S | 20/1 | 20/1 | S | 24 |
| 25 | S | 20/1 | 20/1 | PHASE DETECTOR EMERGENCY LIGHT | 26 |
| 27 | S | 20/1 | 20/1 | PHASE DETECTOR EMERGENCY LIGHT | 28 |
| 29 | S | 20/1 | 20/1 | PHASE DETECTOR EMERGENCY LIGHT | 30 |

| EXISTING PANEL 1C | | | | | |
|-------------------|----------------------------|------|----------|---|----------|
| MAIN | 100 | MLO | VOLTAGE | 480 /277V | MOUNTING |
| BUSING | 100 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS STAIR #9 YELLOW | 30/1 | 30/1 | LIGHTS MAIN CORR. | 2 |
| 3 | LIGHTS MAINTENANCE SHOP | 30/1 | 30/1 | LIGHTS RECEIVING & OFFICE 120, 121, 122, 125A | 4 |
| 5 | LIGHTS MENS ELEVATOR ROOMS | 30/1 | 30/1 | SPACE | 6 |
| 7 | LIGHTS N116 | 30/1 | 30/1 | LIGHTS ELECTRICAL ROOM | 8 |
| 9 | LIGHTS -3RD FL | 30/1 | 30/1 | LIGHTS - COVERED WALKWAY, BOILER, COMMUNITY | 10 |
| 11 | EXISTING | 20/1 | 20/1 | EXISTING | 12 |
| 13 | EXISTING | 20/1 | 30/1 | EXISTING | 14 |
| 15 | EXISTING | 20/1 | --- | SPACE | 16 |
| 17 | SPACE | --- | --- | SPACE | 18 |
| 19 | SPACE | --- | --- | SPACE | 20 |
| 21 | SPACE | --- | --- | SPACE | 22 |
| 23 | SPACE | --- | --- | SPACE | 24 |
| 25 | SPACE | --- | --- | SPACE | 26 |
| 27 | SPACE | --- | --- | SPACE | 28 |

| EXISTING PANEL 4C | | | | | |
|-------------------|------------------------|------|----------|--------------------------------------|-------------------|
| MAIN | 100 | MLO | VOLTAGE | 480 /277V | MOUNTING RECESSED |
| BUSING | 100 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | LIGHTS - SPOTS RIGHT, LIBRARY 4-037 | 2 |
| 3 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | LIGHTS - SPOTS LEFT, LIBRARY 4-037 | 4 |
| 5 | LIGHTS - LIBRARY 4-037 | 20/1 | --- | SPACE | 6 |
| 7 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | LIGHTS - STACKS | 8 |
| 9 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | LIGHTS - STACKS | 10 |
| 11 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | LIGHTS - STACKS | 12 |
| 13 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | S - UNDER NEW DECK LIGHTS | 14 |
| 15 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | S | 16 |
| 17 | LIGHTS - LIBRARY 4-037 | 20/1 | 20/1 | S 2ND FLOOR BY STEPS THIS SIDE ROW 1 | 18 |
| 19 | PHASE DETECTOR | 20/1 | 20/1 | S | 20 |
| 21 | PHASE DETECTOR | 20/1 | 20/1 | LIGHTS - LIBRARY 4-037 | 22 |
| 23 | PHASE DETECTOR | 20/1 | 20/1 | EXISTING | 24 |
| 25 | SPACE | --- | --- | SPACE | 26 |
| 27 | SPACE | --- | --- | SPACE | 28 |
| 29 | SPACE | --- | --- | SPACE | 30 |
| 31 | SPACE | --- | --- | SPACE | 32 |
| 33 | SPACE | --- | --- | SPACE | 34 |
| 35 | SPACE | --- | --- | SPACE | 36 |

| EXISTING PANEL F | | | | | |
|------------------|--|----------|-----------|--|----|
| MAIN | MLO | VOLTAGE | 208 /120V | MOUNTING | |
| BUSING | AMPS | 3-Ph 4-W | | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | PLUGS-PHYSICS LAB | 20/1 | 20/1 | PLUGS 4-013 | 2 |
| 3 | PLUGS-PHYSICS LAB | 20/1 | 20/1 | PLUGS 4-013 | 4 |
| 5 | LIGHTS ? | 20/1 | 20/1 | LIGHTS ? | 6 |
| 7 | LIGHTS ? | 20/1 | 20/1 | LIGHTS S453 | 8 |
| 9 | LIGHTS ? | 20/1 | 20/1 | LIGHTS S453 | 10 |
| 11 | LIGHTS ? S457/454 | 20/1 | 20/1 | 4-002 | 12 |
| 13 | LIGHTS ? S463/469 | 20/1 | 20/1 | EXISTING | 14 |
| 15 | LIGHTS ? | 20/1 | 20/1 | LIGHTS S470 | 16 |
| 17 | LIGHTS ? | 20/1 | 20/1 | LIGHTS S470 | 18 |
| 19 | LIGHTS ? | 20/1 | 20/1 | LIGHTS S466 | 20 |
| 21 | LIGHTS ? | 20/1 | 20/1 | LIGHTS 4-009 S466/S467 | 22 |
| 23 | LTS-4-005 S461 | 20/1 | 20/1 | PLUGS HALL WATER COOLER | 24 |
| 25 | LTS-4-005 S461 | 20/1 | 20/1 | RM 4-4067 | 26 |
| 27 | LTS-4-005 S461 | 20/1 | 20/1 | RM 4-002 PLUGS | 28 |
| 29 | LTS-4-005 S461 | 20/1 | 20/1 | RM 4-002 PLUGS | 30 |
| 31 | PLUGS 4-012 & 4-011 S460 S466 | 20/1 | 20/1 | LIGHTS HALL | 32 |
| 33 | PLUGS 4-012 & 4-013 | 20/1 | 20/1 | LIGHTS HALL | 34 |
| 35 | PLUGS 4-012 & 4-013 | 20/1 | 20/1 | LAB TABLE, PHYSICS - PLUGS | 36 |
| 37 | LIGHTS ELEC. ROOM PLUG 5-004 & WAIT RM | 20/1 | 20/1 | LAB TABLE, PHYSICS - PLUGS | 38 |
| 39 | LIGHTS STAIRS #3 | 20/1 | 20/1 | LAB TABLE, PHYSICS - PLUGS | 40 |
| 41 | LIGHTS STAIRS #2 | 20/1 | 20/1 | WOMEN'S ROOM WATER COOLER RECP. HOUSEKEEPING | 42 |

| EXISTING PANEL 1R | | | | | |
|-------------------|--------------------|------|----------|-----------------------------|----------|
| MAIN | 225 | MLO | VOLTAGE | 480 /277V | MOUNTING |
| BUSING | 225 | AMPS | 3-Ph 4-W | | |
| SCR EXISTING AIC | | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXISTING | 20/1 | 20/1 | EXISTING | 2 |
| 3 | EXISTING | 20/1 | 20/1 | EXISTING | 4 |
| 5 | LOBBY LIGHTS | 20/1 | 20/1 | HALL | 6 |
| 7 | LADIES & MENS ROOM | 20/1 | 20/1 | CORRIDOR LIGHTS OUTSIDE GYM | |

| EXISTING PANEL EMA | | | | | |
|--------------------|---------------------------------------|------|---------|---|-------------------|
| MAIN | 225 | MLO | VOLTAGE | 280 /120V | MOUNTING RECESSED |
| BUSING | 125 | AMPS | | 1-Ph 3-W | SPLIT BUS |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXIT LIGHTS - 2ND FL | 20/1 | 20/1 | EXIT LIGHTS - STARWAY #8 LIGHT 134 E HALL | 2 |
| 3 | EM 1 | 20/1 | 20/1 | EM 2 | 4 |
| 5 | EXIT LIGHTS - COMMUNITY & BOILER ROOM | 20/1 | 20/1 | EXIT LIGHTS - STARWAY #15 | 6 |
| 7 | EM 3 | 20/1 | 20/1 | EM 4 | 8 |
| 9 | LIGHTS - 3RD FL | 20/1 | 20/1 | LIGHTS - COVERED WALKWAY, BOILER, COMMUNITY | 10 |
| 11 | EM 5 | 20/1 | 20/1 | EM 6 | 12 |
| 13 | STARWAY #14 | 20/1 | 20/1 | GAS VALVE N117 | 14 |
| 15 | EM 7 | 20/1 | 20/1 | EM 8 | 16 |
| 17 | LIGHTS CORR, 2ND FL | 20/1 | 20/1 | STARWAY #8 | 18 |
| 19 | EM 9 | 20/1 | 20/1 | EM 10 | 20 |
| 21 | LIGHTS - 2ND FL | 20/1 | 20/1 | FIRE ALARM CABINET | 22 |
| 23 | EM 11 | 20/1 | 30/1 | EM 12 | 24 |
| 25 | ELEVATOR LIGHTS | 20/1 | 20/1 | FIRE ALARM MAGNETIC DOOR LOCKS NORTH W. | 26 |
| 27 | EM 13 | 20/1 | 20/1 | EM 14 | 28 |
| 29 | LIGHTS - 2ND FLOOR | 20/1 | 20/1 | SPRINKLER ALARM | 30 |

| EXISTING PANEL EMA SECT 1 | | | | | |
|---------------------------|------------------------------------|------|---------|--|------------------|
| MAIN | 100 | MLO | VOLTAGE | 240 /120V | MOUNTING SURFACE |
| BUSING | 100 | AMPS | | 1-Ph 3-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | LIGHTS, STAR 1&2 | 20/1 | 20/1 | LIGHTS, EXIT | 2 |
| 3 | LIGHTS, FIRST FLOOR-COR FIRST STOP | 20/1 | 20/1 | LIGHTS, FIRST FLOOR | 4 |
| 5 | LIGHTS, GROUND FLOOR | 20/1 | 20/1 | LIGHTS, FIRST FLOOR | 6 |
| 7 | LIGHTS, GROUND-FLOOR & LADIES ROOM | 20/1 | 20/1 | LIGHTS, SEC. FLOOR | 8 |
| 9 | LIGHTS, SEC. FLOOR | 20/1 | 30/1 | S594 - TWIST LOCK RECEPTACLE | 10 |
| 11 | | 30/1 | 20/1 | 2 POLE 30A S593 COMPUTER | 12 |
| 13 | | 20/1 | 30/1 | S594 - TWIST LOCK RECEPTACLE | 14 |
| 15 | BLACK MAN ELECT LINE | 30/1 | 20/1 | | 16 |
| 17 | | 20/1 | 20/1 | BLUE-ELECT. STAND BY GEN. IN BOILER ROOM | 18 |
| 19 | | 30/2 | 20/1 | WHITE E | 20 |
| 21 | | | 30/1 | S594 TWIST LOCK RECEPTACLE | 22 |
| 23 | SPACE | --- | 20/1 | | 24 |

| EXISTING PANEL EMA SECT 2 | | | | | |
|---------------------------|---------------------|------|---------|-------------|------------------|
| MAIN | 225 | MLO | VOLTAGE | 240 /120V | MOUNTING SURFACE |
| BUSING | 225 | AMPS | | 1-Ph 3-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | COMP RM S594 RECEPT | 20/1 | 20/1 | EXISTING | 2 |
| 3 | EXISTING | 20/1 | 20/1 | EXISTING | 4 |
| 5 | EXISTING | 20/1 | 20/1 | EXISTING | 6 |
| 7 | EXISTING | 20/1 | 20/1 | EXISTING | 8 |
| 9 | EXISTING | 20/1 | 20/1 | EXISTING | 10 |
| 11 | EXISTING | 20/1 | 20/1 | EXISTING | 12 |
| 13 | EXISTING | 20/1 | 20/1 | EXISTING | 14 |
| 15 | EXISTING | 20/1 | --- | SPACE | 16 |
| 17 | SPACE | --- | --- | SPACE | 18 |
| 19 | SPACE | --- | --- | SPACE | 20 |
| 21 | SPACE | --- | --- | SPACE | 22 |
| 23 | SPACE | --- | --- | SPACE | 24 |
| 25 | SPACE | --- | --- | SPACE | 26 |
| 27 | SPACE | --- | --- | SPACE | 28 |
| 29 | SPACE | --- | --- | SPACE | 30 |

| EXISTING PANEL EMB | | | | | |
|--------------------|----------------|------|---------|-------------|------------------|
| MAIN | 100 | MLO | VOLTAGE | 240 /120V | MOUNTING SURFACE |
| BUSING | 100 | AMPS | | 1-Ph 3-W | SPLIT BUS |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXISTING | 20/1 | 20/1 | EXISTING | 2 |
| 3 | EXISTING | 20/1 | 20/1 | EXISTING | 4 |
| 5 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING | 6 |
| 7 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING | 8 |
| 9 | EXISTING | 20/1 | 20/1 | EXISTING | 10 |
| 11 | EXISTING | 20/1 | 20/1 | EXISTING | 12 |
| 13 | EXISTING | 20/1 | 20/1 | EXISTING | 14 |
| 15 | EXISTING | 20/1 | 20/1 | EXISTING | 16 |
| 17 | EXISTING | 20/1 | 20/1 | EXISTING | 18 |
| 19 | EXISTING | 20/1 | 20/1 | EXISTING | 20 |
| 21 | EXISTING | 20/1 | 20/1 | EXISTING | 22 |
| 23 | SPACE | 20/1 | 20/1 | SPACE | 24 |

| EXISTING PANEL EMC | | | | | |
|--------------------|-------------------------------------|------|---------|---|-------------------|
| MAIN | 225 | MLO | VOLTAGE | 240 /120V | MOUNTING RECESSED |
| BUSING | 225 | AMPS | | 1-Ph 3-W | SPLIT BUS |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXIT LIGHTS CORR, 5TH FLOOR, B-SEC. | 20/1 | 20/1 | EXIT LIGHTS CORR, 4TH FLOOR, C-SEC., STAIRS G | 2 |
| 3 | EM 1 | 20/1 | 20/1 | EM 2 | 4 |
| 5 | LIGHTS CORR, 5TH FLOOR, B-SEC. | 20/1 | 20/1 | LIGHTS CORR, 4TH FLOOR, C-SEC. | 6 |
| 7 | EM 3 | 20/1 | 20/1 | EM 4 | 8 |
| 9 | EXISTING | 20/1 | 20/1 | EXISTING | 10 |
| 11 | EM 5 | 20/1 | 20/1 | EM 6 | 12 |
| 13 | EXISTING | 20/1 | 20/1 | EXISTING | 14 |
| 15 | EM 7 | 20/1 | 20/1 | EM 8 | 16 |
| 17 | EXISTING | 20/1 | 20/1 | EXISTING | 18 |
| 19 | EM 9 | 20/1 | 20/1 | EM 10 | 20 |
| 21 | SPACE | 20/1 | 20/1 | SPACE | 22 |
| 23 | SPACE | 20/1 | 20/1 | SPACE | 24 |

| EXISTING PANEL EMD | | | | | |
|--------------------|--|------|---------|---|------------------|
| MAIN | 225 | MLO | VOLTAGE | 208 /120V | MOUNTING SURFACE |
| BUSING | 225 | AMPS | | 1-Ph 3-W | SPLIT BUS |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXIT LIGHT D - 5TH FLOOR A SEC. STAR #1, 4TH FLOOR | 20/1 | 20/1 | EXIT LIGHTS - A SEC. 5TH FLOOR B SEC. | 2 |
| 3 | EXISTING | 20/1 | 20/1 | EXISTING | 4 |
| 5 | LIGHTS - 5TH FLOOR A & B SEC. | 20/1 | 20/1 | LIGHTS - 4TH FLOOR A & B SEC. | 6 |
| 7 | LIGHTS - 5-032, 033, 031, 037, 034, 5-038 | 20/1 | 20/1 | LIGHTS LECTURE CENTER BLUE LIGHTS 5-041 | 8 |
| 9 | LIGHTS - STAR #4 | 20/1 | 20/1 | EXISTING | 10 |
| 11 | EXISTING | 20/1 | 20/1 | EXISTING | 12 |
| 13 | EXISTING | 20/1 | 20/1 | EXISTING | 14 |
| 15 | EXISTING | 20/1 | 20/1 | EXISTING | 16 |
| 17 | EXISTING | 20/1 | 20/1 | EXISTING | 18 |
| 19 | EXISTING | 20/1 | 20/1 | EXISTING | 20 |
| 21 | EXISTING | 20/1 | 20/1 | EXISTING | 22 |
| 23 | EXISTING | 20/1 | 20/1 | EXISTING | 24 |

| EXISTING PANEL EMF | | | | | |
|--------------------|----------------------|------|---------|-----------------------|------------------|
| MAIN | 125 | MLO | VOLTAGE | 480 /277V | MOUNTING SURFACE |
| BUSING | 125 | AMPS | | 3-Ph 4-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXIT SIGNS | 20/1 | 20/1 | SPARE (OFF) | 2 |
| 3 | CORRIDOR LTS | 20/1 | 20/1 | SPARE (OFF) | 4 |
| 5 | TOILETS-MEN & WOMAN | 20/1 | 20/1 | SPARE (OFF) | 6 |
| 7 | FITNESS ROOM | 20/1 | 20/1 | STARWAY LTS (TRIPPED) | 8 |
| 9 | DANCE STUDIO COSTUME | 20/1 | 20/1 | MECH & ELECT RM GR FL | 10 |
| 11 | SPARE (OFF) | 20/1 | 20/1 | SPARE (OFF) | 12 |
| 13 | SPARE (OFF) | 20/1 | 20/1 | SPARE (OFF) | 14 |
| 15 | SPARE (OFF) | 20/1 | 20/1 | STARWAY LTS | 16 |
| 17 | SPARE (OFF) | 20/1 | 20/1 | SPARE (OFF) | 18 |
| 19 | SPARE (OFF) | 20/1 | 20/1 | SPARE (OFF) | 20 |
| 21 | SPARE (OFF) | 20/1 | 20/1 | SPARE (OFF) | 22 |
| 23 | SPARE (OFF) | 20/1 | 20/1 | SPARE (OFF) | 24 |

| EXISTING PANEL EMG | | | | | |
|--------------------|-------------------|------|---------|----------------------|------------------|
| MAIN | 125 | MLO | VOLTAGE | 480 /277V | MOUNTING SURFACE |
| BUSING | 125 | AMPS | | 3-Ph 4-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXIT SIGNS | 20/1 | 20/1 | GYM LTS | 2 |
| 3 | CORRIDOR LIGHTS | 20/1 | 20/1 | EXISTING (OFF) | 4 |
| 5 | CLASSROOM LIGHTS | 20/1 | 20/1 | EXISTING (OFF) | 6 |
| 7 | 1ST FLOOR TOILETS | 20/1 | 20/1 | EXISTING (OFF) | 8 |
| 9 | STARWAY A | 20/1 | 20/1 | MECH ROOMS 2ND FLOOR | 10 |
| 11 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 12 |
| 13 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 14 |
| 15 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 16 |
| 17 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 18 |
| 19 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 20 |
| 21 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 22 |
| 23 | EXISTING (OFF) | 20/1 | 20/1 | EXISTING (OFF) | 24 |

| EXISTING PANEL EMH | | | | | |
|--------------------|----------------------|------|---------|----------------|------------------|
| MAIN | 30 | MCB | VOLTAGE | 208 /120V | MOUNTING SURFACE |
| BUSING | 125 | AMPS | | 3-Ph 4-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | EXISTING | 20/1 | 20/1 | GYM LTS | 2 |
| 3 | OUTSIDE EXIT FIXTURE | 20/1 | 20/1 | EXISTING (OFF) | 4 |
| 5 | AUDITORIUM RECESS LT | 20/1 | 20/1 | EXISTING | 6 |
| 7 | EXISTING | 20/1 | | | 8 |
| 9 | EXISTING | 20/1 | 20/3 | EXISTING | 10 |
| 11 | EXISTING | 20/1 | | | 12 |
| 13 | | | | | 14 |
| 15 | MAN | 30/3 | | | 16 |
| 17 | | | | | 18 |

* ONLY HOT WHEN GEN. RUNNING

| EXISTING PANEL EMJ | | | | | |
|--------------------|-------------------------|------|---------|----------------------------|------------------|
| MAIN | 125 | MCB | VOLTAGE | 208 /120V | MOUNTING SURFACE |
| BUSING | 125 | AMPS | | 3-Ph 4-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | WHEELCHAIR LIFT #2 7 | 20/1 | | | 2 |
| 3 | WHEELCHAIR LIFT #1 6 | 20/1 | 15/3 | EXISTING | 4 |
| 5 | WHEELCHAIR LIFT #3 8 | 20/1 | | | 6 |
| 7 | OUTLET RECEPT BELOW PNL | 20/1 | | | 8 |
| 9 | EXISTING | 20/1 | 15/3 | EXISTING | 10 |
| 11 | OUTLET FOR GEN | 20/1 | | | 12 |
| 13 | EXISTING | 20/1 | 20/1 | F A POWER SUPPLY | 14 |
| 15 | EXISTING | 20/1 | 15/2 | RM S-594 208V RECEPT ACLES | 16 |
| 17 | SPACE | --- | --- | | 18 |
| 19 | SPACE | --- | 15/2 | RM S-594 208V RECEPT ACLES | 20 |
| 21 | SPACE | --- | --- | | 22 |
| 23 | SPACE | --- | --- | SPACE | 24 |
| 25 | | | | | 26 |
| 27 | EXISTING | 60/3 | | | 28 |
| 29 | | | | | 30 |

| EXISTING PANEL EMK | | | | | |
|--------------------|----------------------------------|-------|---------|-------------------|------------------|
| MAIN | 225 | MLO | VOLTAGE | 480 /277V | MOUNTING SURFACE |
| BUSING | 225 | AMPS | | 3-Ph 4-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | | | | | 2 |
| 3 | XFMR T-2 30A #10AWG CU-(PNL-EMJ) | 30/3 | 40/3 | EMG 40A #6 ALUM | 4 |
| 5 | | | | | 6 |
| 7 | | | | | 8 |
| 9 | ELEVATOR #2 ALUMINUM | 90/3 | 40/3 | EMF 40A #8AWG CU. | 10 |
| 11 | | | | | 12 |
| 13 | | | | SPACE | 14 |
| 15 | XFMR T-5 100A #2 CU (PNL-NE) | 100/3 | | SPACE | 16 |
| 17 | | | | SPACE | 18 |
| 19 | SPACE | --- | --- | SPACE | 20 |
| 21 | SPACE | --- | --- | SPACE | 22 |
| 23 | SPACE | --- | --- | SPACE | 24 |
| 25 | SPACE | --- | --- | SPACE | 26 |
| 27 | SPACE | --- | --- | SPACE | 28 |
| 29 | SPACE | --- | --- | SPACE | 30 |

| EXISTING PANEL NE | | | | | |
|-------------------|-------------|------|---------|-------------|------------------|
| MAIN | 250 | MCB | VOLTAGE | 208 /120V | MOUNTING SURFACE |
| BUSING | 400 | AMPS | | 3-Ph 4-W | |
| SCR EXISTING | AIC | | | | |
| NO | DESCRIPTION | CB/P | CB/P | DESCRIPTION | NO |
| 1 | | | 20/1 | EXISTING | 2 |
| 3 | PNL TR3W | 70/3 | 20/1 | EXISTING | 4 |
| 5 | | | 20/1 | EXISTING | 6 |
| 7 | SPACE | --- | --- | SPACE | 8 |
| 9 | SPACE | --- | --- | SPACE | 10 |
| 11 | SPACE | --- | --- | SPACE | 12 |
| 13 | SPACE | --- | --- | SPACE | 14 |
| 15 | SPACE | --- | --- | SPACE | 16 |
| 17 | SPACE | --- | --- | SPACE | 18 |
| 19 | SPACE | --- | --- | SPACE | 20 |
| | | | | | |